COMBAT AIRCRAFT 112

Robert Forsyth

LUFTWAFFE *MISTEL* COMPOSITE BOMBER UNITS

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SERIES EDITOR TONY HOLMES

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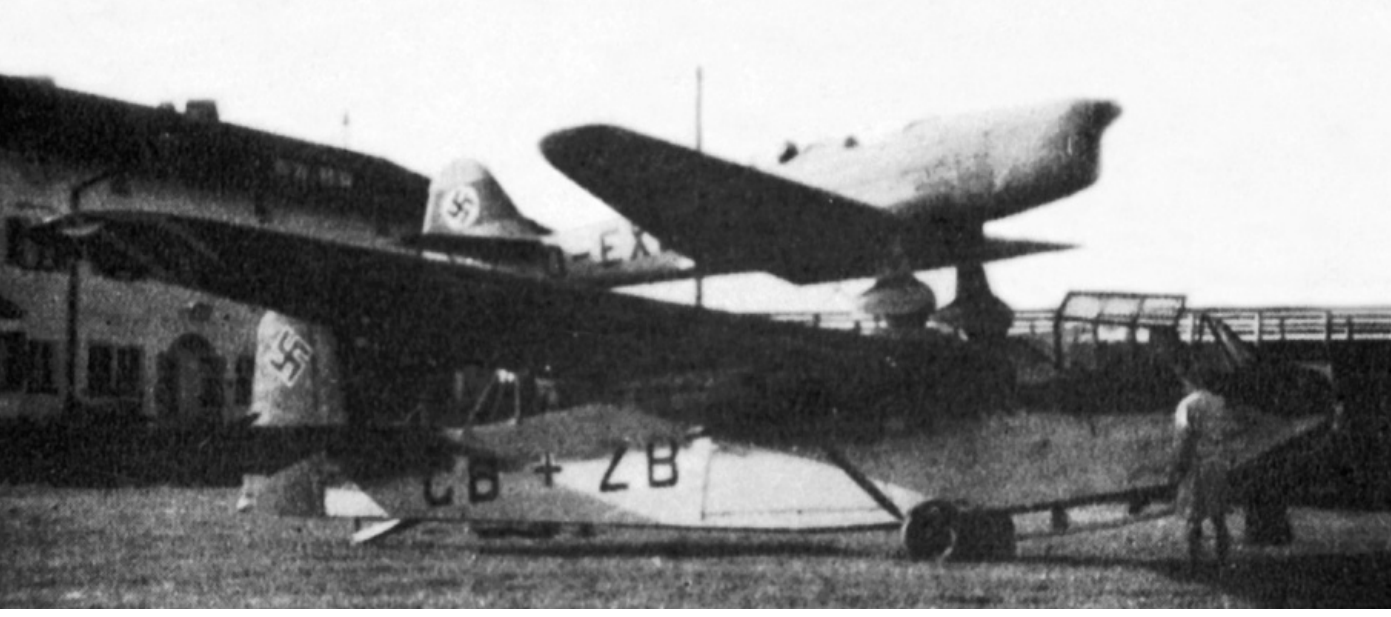


Fritz Stamer's first flying composite paired Klemm Kl 35 D-EXCM with DFS 230B-2 'CB+ZB', as seen here at the DFS Ainring in the autumn of 1942

CHAPTER ONE

FLYING MACHINES

On 1 September 1942, in the skies over the southern German Alps, two test pilots, Karl Schieferstein and Kurt Oppitz of the *Deutsche Forschungsanstalt für Segelflug* (DFS – German Research Institute for Gliders), commenced a bold new form of aeronautical experimentation. At an altitude of around 1000 metres, a Ju 52/3m released the 80-metre towline to a strange-looking, but innovative hybrid – a DFS 230 glider, to which was attached above a Klemm Kl 35 low-wing monoplane trainer. This two-aircraft combination was the brainchild of Fritz Stamer, the main director of the DFS and a highly experienced glider instructor who had flown in various soaring competitions over the Wasserkuppe during the 1920s. An enterprising aviator, Stamer had piloted several experimental flying machines including tailless gliders and, in 1928, an early rocket-powered aircraft launched by a rubber shock cord.

But in early 1942, following the success of the German towed glider operations at Fort Eben-Emael, in Belgium, in May 1940 and during the invasion of Crete exactly a year later, Stamer embarked upon an alternative design intended to deliver airborne troops by means of a glider mounted rigidly beneath a powered aircraft. The latter would jettison the glider once over the target area.

As radical as it may have been, such a method of air-towing was not new. In July 1927, the eminent German aircraft engineer Professor Hugo Junkers had filed a patent application for a design in which 'a flying

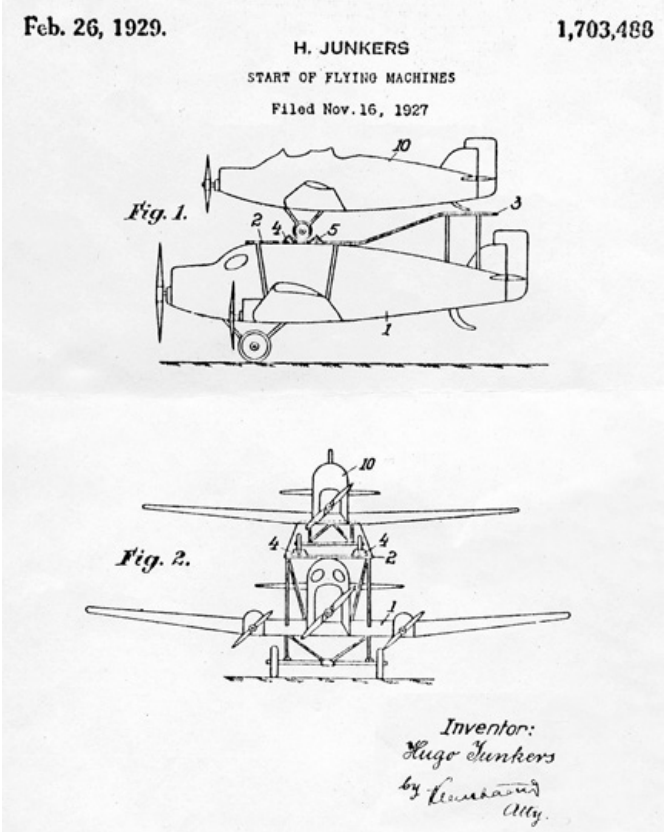
machine is placed on or connected with another flying machine of some suitable type, which serves for imparting to the machine to be started an additional acceleration and, if desired, to support it in the air until a predetermined altitude has been attained. The aircraft to be started is supported by another flying machine.

'Preferably, the craft to be started is placed from above onto an auxiliary flying machine provided with means for supporting the craft. The machine to be started can separate itself from the auxiliary craft as soon as the supporting surfaces [wings] of the craft to be started have attained the lift required for free flight. The [upper] machine is placed on top of the auxiliary machine, the engines of both machines are started, and the auxiliary machine now starts rolling until it comes free from the ground, whereupon both crafts together can rise to a predetermined altitude, when the separation of the [upper] craft can be effected by suitably adjusting the rudders or ailerons of the crafts, if desired in connection with a slackening down of the engine of the supporting craft.'

In this composite design, the type of Junkers aircraft used for the upper machine is not positively identifiable, though it may have been a J 20 two-seat, low-wing monoplane, while the Professor probably foresaw the lower component as being a J 24/G 24 three-engined, all-metal transport.

Junkers was followed by others, including Dr.-Ing. Claude Dornier, who, in October of the same year, lodged a patent in which he intended that, 'a large, heavily-loaded aircraft be fitted with additional separable/jettisonable aircraft, the latter's engines providing additional power to improve the takeoff and climb performance of the large aircraft. The jettisonable aircraft may be attached to the upper or lower surface of the large aircraft's wing, and they are fitted with control surfaces that will allow them to fly back to the ground once they have been jettisoned'.

One of the earliest known composite designs produced in inter-war Germany was contained in this patent filed on 16 November 1927 by the aircraft designer Professor Hugo Junkers for the 'Start of Flying Machines'. It is believed to have been based on the Junkers J 20 two-seat, low-wing monoplane as the upper component, with a J 24 or G 24 three-engined, all-metal transport as the lower component



Both designs came to nothing, but outside Germany, other nations were dabbling with composite experiments. In Britain, these culminated with the development and flight of the Short-Mayo Composite in 1938.

At the DFS field at Ainring, however, Stamer was convinced his invention would succeed and prove workable. A DFS 230B-2 was modified in such a way that the area of wing close to the wing roots was fitted with a trough-shaped support intended to take the wheels of a Kl 35, thus ensuring that the weight of the aeroplane could be spread evenly over the wing surface of the glider via a reinforcing plate bonded to it with glue. A tubular steel trestle was mounted

forward of the tail of the DFS 230 which supported the Kl 35's tail skid in a sheet steel shoe.

The two aircraft were then fastened to one another by means of a pyramid system of wires attached to four points on the upper fuselage of the DFS 230 and coupled together at a single point under the fuselage of the Kl 35. The four wires comprising the pyramid were tightened to create a combined tension of 1000 kg. In this condition the sprung undercarriage of the Kl 35 was fully compressed. The DFS 230 retained its normal jettisonable undercarriage but without brakes, although it was not intended to jettison the undercarriage for the purpose of the trials. Communication between the pilots of the upper and lower components would be made via an intercom whose cable ran along one of the pyramid support wires.

The weight of the Kl 35, when carrying only one pilot, was 600 kg – easily manageable by the DFS 230B-2, which had a maximum payload of 1200 kg. The takeoff weight for the Kl 35/DFS 230 combination totalled 1675 kg. However, Stamer did recognise that the power of the Kl 35 was insufficient to 'carry' a DFS 230, and that the low flight speed of such a combination would result in a comparative reduction of around 60 km/h between a single Kl 35 and Kl 35/DFS 230 composite. It was therefore proposed that trials should be conducted using a Ju 52/3m as a tow-aeroplane, with separation of the Klemm and the glider taking place in horizontal flight at a speed of 120 km/h. As a safeguard against problems arising during separation, the DFS 230 was fitted with a brake parachute, the deployment of which was expected to decelerate the glider sufficiently to allow the Kl 35 to fly free.

Glider and DFS pilot Karl Schieferstein was a key member of the early *Mistel* test team. He was recognised for his 'calmness, level-headedness and innate teaching ability, as well as for his thorough flying and technical knowledge and capabilities. These qualities made him one of the most liked and successful of instructors. It is to the credit of Schieferstein that flight operations, often accompanied by unusual requirements, could continue to be conducted at the DFS without serious accident right up to the end'

Karl Schieferstein recalled the flight tests;

'I was put "on top", possibly because I was a little smaller, and that is exactly where I remained for the rest of the trials. The Kl 35, with its open cockpit, was a breezy but exciting place of work for me. At the very beginning of this trial, each pilot made his own control inputs without making his intentions known to the other aircraft. The burden of steering the couple lay with the pilot of the aircraft below, with my assistance from above when I could predict his intentions.'

The controls in both components handled reasonably well in towed flight at speeds of between 130 and 150 km/h, though aileron response was viewed as 'sluggish' when controlled by the DFS 230 and 'poor' when by the Klemm. There was also a small nose-down pitching moment that was generated when the Kl 35's throttle was opened to full power. This, however, could be trimmed with the elevator trim tab. The reason for this characteristic is believed to have been due to the propeller slipstream increasing the download on the tailplane of the DFS 230 and thereby effectively raising the thrust axis above the centre-of-gravity. Schieferstein remembered;

'The Klemm's 105 hp powerplant was insufficient to maintain horizontal flight, and it was most definitely not powerful enough for takeoff and

climb. The airborne handling and performance of this launch platform was eagerly awaited, and when the time came to separate it actually worked fairly well. The Kl 35 literally leapt up as the spring-loaded attachment struts launched me upward and away from the glider – I pushed the throttle forward and easily climbed away.'

Landing the coupled combination also proved trouble-free, with Kurt Oppitz issuing instructions concerning the use of the throttle and elevators to Schieferstein over the intercom.

These successful initial air tests paved the way for a second phase of testing, which saw the Kl 35 replaced by a Focke-Wulf Fw 56 *Stösser* high-wing trainer that offered increased power in the form of a 240 hp Argus AS 10C engine as well as improved aerodynamics. The Fw 56 was mounted on top of the DFS 230 in the same way as the Klemm had been, with some minor adjustments to take into account its increased dimensions and weight, although at 985 kg the Focke-Wulf was still well within the payload allowance of the glider. The takeoff weight for the Fw 56/DFS 230 combination totalled 2060 kg.

Once again, the composite was towed into the air by a Ju 52/3m, with Schieferstein at the controls of the Fw 56 and Oppitz piloting the DFS 230. This time, either pilot could control the combination, and the tests went faultlessly. Separation took place at 130 km/h, and less nose-down pitching took place when the throttles were adjusted. But there was one problem that Stamer and his team could not overcome – vertical oscillation during takeoff.

The composite had been designed in such a way as to be equipped for blind-flying, and following the successful conclusion of the initial flight tests, the DFS investigated the possibility of rigidly towing the DFS 230/Fw 56 combination with a He 111 as a tow-aeroplane. By 1940, gliders were being towed by powered aircraft using a long cable, but such flights highlighted the inherent difficulties involved in conditions of bad weather or poor visibility, which then introduced the prospect of instrument- or blind-flying. But irrespective of instruments, if a glider pilot was unable to see the aircraft in front of him, the risks became very grave. Eventually, tests were conducted using a much shortened towline of only 1.5 metres in length.

The Kl 35 D-EXCM and DFS 230B-2 'CB+ZB' composite in flight over the southern German Alps in late 1942. Control of the combination in flight was with the pilot of the glider, and generally the coupling worked well, even during combined landings

Success with the Kl 35 paved the way for trials with Focke-Wulf Fw 56 'CA+GN' as the upper component above DFS 230B-2 'CB+ZB'. The combination proved tricky to handle, with increased power but greater weight and poor aileron control. Nevertheless, by the conclusion of trials, DFS director Fritz Stamer viewed the composite as operationally ready. Both machines were photographed at the DFS Ainring on a sunny autumn day in 1942. The Fw 56 carries the emblem of its original operator, the *Flugzeugführerschule* A/B 112 at Böblingen. Note the tarpaulin protecting the canopy of the DFS 230 glider and the brake parachute fitted to the rear underside of the fuselage, which was for use in case of problems experienced during separation. The deployment of the 'chute would decelerate the glider sufficiently to allow the Kl 35 to fly free

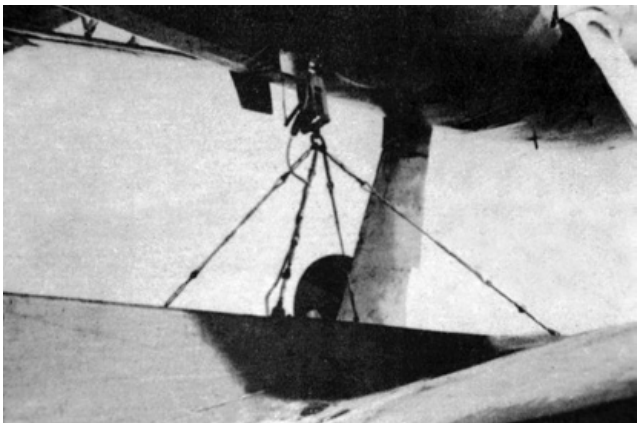
A series of such tests with the composite arrangement was made with a He 111 piloted by Erich Klöckner, with Oppitz at the controls of the Fw 56 and Paul Stämmler in the DFS 230. These tests revealed problems in the relationship of the towing attachment point to the high centre-of-gravity, as well as the significantly higher inertia and poor aileron effectiveness of the combination.

On 19 October 1942 near disaster ensued. The He 111 took off to the west along the runway at Ainring into a light prevailing wind with the composite trailing behind it. As the Heinkel gathered speed, so the composite began to bump along the ground, before vibrating. The towline suddenly snapped and the combination bounced on the ground, skidded off the runway and came to rest in a field with a damaged starboard wing. Klöckner recalled;

'All involved knew this kind of launch was inherently very risky, the instability of this configuration being well known from previous trials, and the centre-of-gravity of the combination did not make it any easier. After lifting off, very light vertical oscillations began, as experienced during solo tow. However, these oscillations increased rapidly to an intensity not previously experienced by the composite pilots, or by me in the He 111. They quickly became so violent, even during the takeoff, that the DFS 230 hit the ground hard on several occasions. Quick thinking as ever, Stämmler, thank God, released the tow.'

Meanwhile, the Fw 56 had been shaken off its support struts and damaged its tail. Klöckner remembered;

'The next impact was so strong that the Fw 56, mounted on top of the cargo glider, was torn from its mounting, damaging the empennage. Half the elevator was broken off, but Kurt Oppitz managed to land the *Stösser* without too much difficulty. As a result of the hard impact, the cargo glider bounced uncontrolled into the air, hitting the ground in a field outside the airfield boundary, right wing first.'



The central wire pyramid brace between the catchment hook on the underside of the Fw 56 and the fuselage uppersurface of the DFS 230. The brace had an intercom cable and pull-out connector fitted to it. This photograph has been taken looking towards the trailing edge and root of the DFS 230's right wing and the left mainwheel leg of the Fw 56

The He 111 reached the end of the runway, at which point Klöckner pulled up, but not before the aircraft's tail had sliced through a hedge. The Heinkel managed to lift off, its wheels and elevator tearing through the boundary hedge. However, as Klöckner recalled;

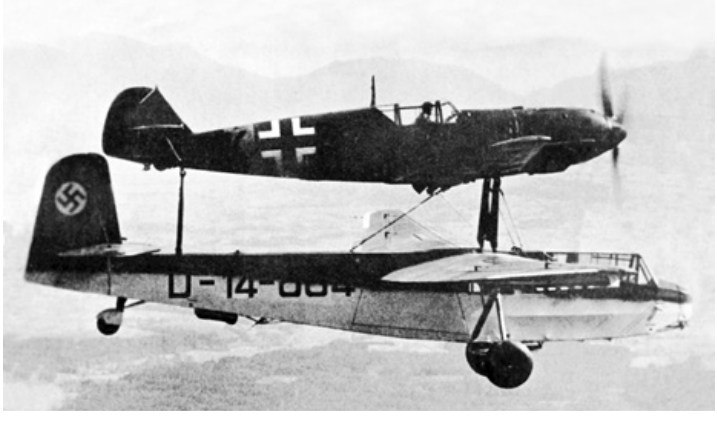
'Apart from the less than happy overall result, the launch nearly ended in catastrophe for another reason. In the right seat next to me sat "*Schorsch*" Keller, the flight mechanic. During the takeoff, he suffered some kind of panic attack and, jumping from his seat, tore open the top cabin window and began shouting, apparently in fear of his imminent death, "*It's not going to work! It's not going to work!*" He then tried to squeeze himself through the window. There was nothing else for me to do but to grab him roughly by the seat of his pants and pull him back down into his seat, where he sat motionless, until we landed. I felt sorry for him, as "*Schorsch*" was one of our oldest and most respected flight mechanics, but he just did not have the nerve any longer for this type of dangerous situation.'

Luckily, however, there was no damage inflicted on the He 111, and the aircraft was able to land.

It is not known exactly when, but at some point during these early composite trials Fritz Stamer dubbed the process as the '*Mistel* Method of Towing'. The reason for the name is unclear, and it has been the subject of conjecture, but former *Mistel* pilots related to the author how it was chosen because of the way in which mistletoe, as a parasitic plant, takes its nourishment from large trees such as oaks in the same way it was foreseen that the upper aircraft of the composite would take its fuel from the lower aircraft (see Chapter Three).

In his report dated 22 October 1942, Stamer wrote;

'The flying and control characteristics of the DFS 230/Kl 35 and DFS 230/Fw 56 *Mistel* combinations in tow, free flight, separation and coupled landing have proven so normal that they can be considered operationally ready.'



The Bf 109E 'K+A' and DFS 230 D-14-884 combination in flight from Ainring in late 1943. The composite is seen here in its initial form, with Karl Schieferstein piloting the Bf 109 and Hermann Zitter sitting in the rear seat of the DFS 230. A swivelling tailwheel support structure was fitted onto the upper fuselage in front of the DFS 230's tailplane. The Bf 109E was fitted with a twin mounting fixture on the underside of the wing close to the wing root and front spar. A similar fitting was added underneath the fuselage in front of the retractable tailwheel. The swivelling framework, as well as the tail support, were fitted with open, claw-type fittings in which the opening was arranged upwards at approximately 45 degrees to the vertical. The framework was braced so that it leaned forward and could be folded down towards the nose of the DFS 230. Note also the brake parachute fitted to the rear underside of the glider's fuselage, which was for use in case of problems experienced during separation

But Stamer wanted to progress further. He wanted all future designs to allow the pilot of either aircraft to take control of the composite at takeoff, during separation and during coupled landings. Furthermore, if the upper component of the *Mistel* could be a single-engined fighter, then it would be able to offer protection to the lower component after separation. In this regard, the obvious choice was a Bf 109, and so it was that on 21 June 1943 a new composite was declared ready for flight-testing. This comprised a Bf 109E atop a DFS 230. Preliminary tests with the individual aircraft were carried out at Ainring, following which they were moved to Hörsching, where there was a 1700-metre concrete runway that was better suited for experiments with the 1085 hp Daimler-Benz DB 601-powered Bf 109E. This combination would be able to take off under the power of the Messerschmitt fighter.

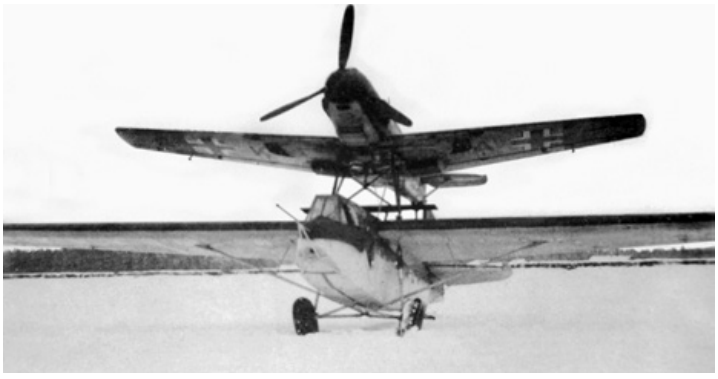
Another photograph of the Bf 109E/DFS 230 composite in flight. The Bf 109 upper component was braced by a wire stretched from a coupling on the underside of its fuselage close to its centre-of-gravity to a point approximately halfway along the fuselage of the DFS 230. At the point of separation, use of a clutch allowed the swivelling framework between the fighter and the glider to rotate forward and free the Bf 109. However, a mid-air collision between the two components over Hörsching forced a redesign of the framework

The DFS 230 had had its undercarriage modified to accept the Bf 109, since ordinarily the increased weight of the fighter would have placed considerable strain on the structure and standard undercarriage of the glider. Stamer recorded;

'The extended undercarriage of the Bf 109 as well as the wheel wells on the underside of the wing appeared so aerodynamically unfavourable that it was decided not to use the method of mounting the Kl 35 and Fw 56 *Mistel* combinations. Instead, the Bf 109 was supported on a swivelling framework mounted on the DFS 230 and not on its own undercarriage.'

A swivelling tailwheel support was also fitted onto the DFS 230's upper fuselage in front of the tailplane. Loads were then transferred via the reinforced rear fuselage structure to the glider's tailwheel. The bearings on this framework could be freed by means of a clutch and the last stage in releasing the upper aircraft was achieved through the forward rotation of the framework. The attachments on the lower end of the framework, close to the wing roots of the DFS 230, also served to transfer the weight of the Bf 109 directly to the glider's undercarriage. The revised undercarriage for the DFS 230 incorporated legs and wheels from a Junkers W 34 and the tailwheel from an Hs 126.

The Bf 109E was fitted with a mounting fixture on the underside of the wing, close to the wing root and front spar. A similar fitting was added underneath the fuselage in front of the retractable tailwheel. The swivelling framework, as well as the tail support, were fitted with open, claw-type fittings in which the opening was arranged upwards at approximately 45 degrees to the vertical. The framework was braced so that it leaned forward and could be folded down towards the nose of the DFS 230. The Bf 109 was braced by a wire stretched from a coupling on the underside of its fuselage, close to its centre-of-gravity, to a point approximately



The revised design of the Bf 109E/ DFS 230 composite at Ainring in the winter of 1943/44. The Bf 109 was the same aircraft that had conducted the earlier trials with a simpler support strut arrangement, while the DFS 230 has been recoded as D-IEXX

halfway along the fuselage of the DFS 230. When the separation process commenced, use of the previously mentioned clutch allowed the framework to rotate forward and free the Bf 109.

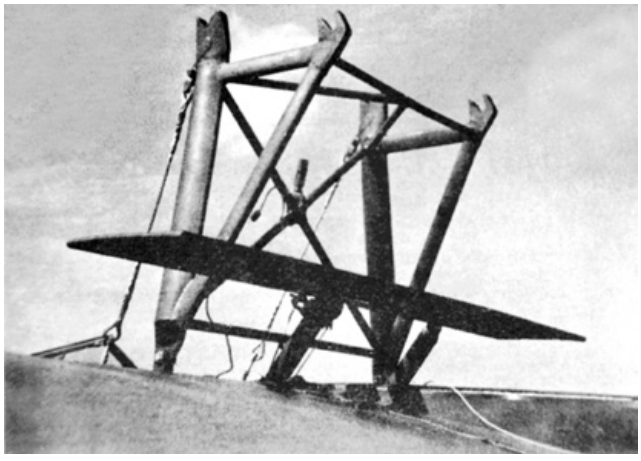
During the first test, after taxiing about 500 metres the combination lifted off the runway prior to full throttle having been applied. The ensuing flight lasted 40 minutes, reaching an altitude of 2000 metres. Speed was held below 240 km/h in order not to exceed the maximum permissible towing speed of the DFS 230. A second takeoff was performed immediately after the landing of the first flight. The takeoff run on this occasion was estimated to be 400 metres. With the Bf 109 flying at full throttle, separation was performed at an altitude of 2000 metres and at a speed of 180 km/h, but on this occasion the DFS 230 reared up and collided with the coupling under the Bf 109, whereby the glider's canopy was slightly damaged. On another test flight, Schieferstein recalled how 'upon release, the tailwheel of the Me 109 went straight through the hood of the [DFS 230's] cabin, right in front of my nose'. A serious collision was only avoided by the quick deployment of the spoilers on the DFS 230, which caused rapid deceleration.

Testing was transferred back to Ainring, but due to the earlier collision over Hörsching it was found necessary to modify the tail-mounting framework in such a way that the inclination of one aircraft relative to the other could be increased. Two extra mountings were added close to the rear spar fittings of the Bf 109 and in line with the forward fixtures. The single plane framework mounted to the DFS 230 was rebuilt as an open truss, additional struts being added to the main supports to create a V-shaped structure. Once these and other modifications had been completed, flight-testing recommenced on 16 July 1943.

The shorter runway at Ainring proved adequate and a coupled landing was made. In one flight, separation was carried out at an altitude of 1500 metres, but again the DFS 230 reared up and the framework swung forward. This time, however, the rear struts restraining the Bf 109 lifted, thereby increasing the relative angle between the two aircraft and easing separation. One of the lateral struts of the framework was deformed when it hit the guard on the tailwheel of the Bf 109, but both aircraft landed without difficulty.

Tests were undertaken with the DFS 230 carrying ballast of 500-600 kg in excess of its normal all-up weight in order to counter-balance the weights

of the more rearward location of the pilot's seat, the framework, the undercarriage, the reinforcements to the tail and the accommodation of a second crewman. The DFS 230 was not flown at its maximum payload of 1000-1200 kg. Rather, it was intended to measure the forces on the framework at various speeds. The Bf 109 was mounted at different angles of incidence and with various flap settings to determine which flight configurations would result in a part of the weight of the Bf 109 being carried by the DFS 230. By early January 1944, however, Fritz Stamer was able to report;



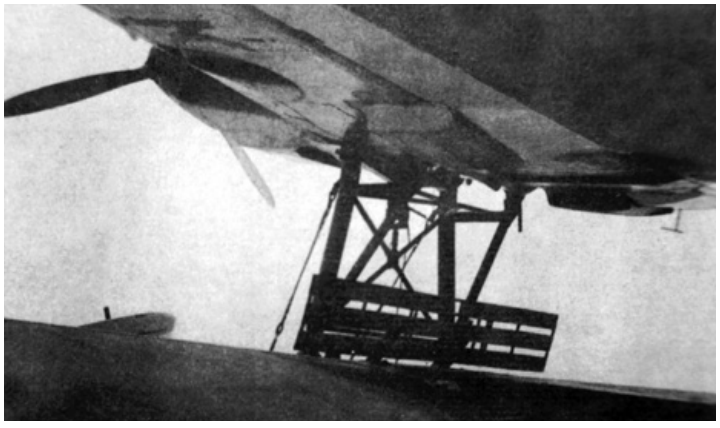
The modified support truss for the Bf 109E/DFS 230 composite. Two further mountings were added close to the rear spar fittings of the Bf 109 and in line with the forward fixtures. The single plane framework mounted to the DFS 230 was rebuilt as an open truss, additional struts being added to the main supports to create a V-shaped structure. The open claw fittings were remounted on the rear struts and flat pads were added at their previous positions to transfer the loads from the fittings near the front spar of the Bf 109. A latching device was added to the tailwheel support, which was released only after the support had rotated forward through a pre-defined angle. The wire anchoring the Bf 109 to the DFS 230 was no longer needed, and it was replaced by a coupling located on the centreline of the Bf 109, in the same plane as the forward struts of the truss structure. Note also the intercom connector and the stowed position of the dive brake

'Flight tests with a *Mistel* combination comprising a DFS 230 below and a Bf 109E above demonstrated faultless in-flight, takeoff and landing characteristics. Control capability was available with only one of the aircraft. With the combined controls of both aircraft, the controllability was good.'

Unfortunately for Stamer, things did not always go according to plan, and at one critical stage in its development the *Mistel* faced disaster during a demonstration set up by him for officials from the *Reichsluftministerium* (RLM). As Karl Schieferstein recalled;

'Stämmler sat in the DFS 230 and I was in the Me 109. We had planned to make a clean approach. I separated, but the mechanism did not work properly. Just as we reached an altitude of only five metres, Stämmler said, "*Karl, separate now!*" I replied "*I have separated!*" Stämmler, "*Oh, my God!*" The ground came closer. We attempted a soft landing. Just as we landed the mechanism freed itself. I felt the movement, gave full throttle, made an elegant turn and landed almost alongside Stämmler, who had just rolled to a stop. The *Mistel* test had been rescued. Everyone had been impressed, only Fritz Stamer having noticed anything was wrong.'

Despite these minor technical problems the first tests had demonstrated that the *Mistel* composite could work operationally, and not just as a form of transport. Already, there were those within the RLM who viewed the concept as offering a much greater – offensive – potential.



The Bf 109E mounted on its modified supports with the dive brake in the deployed position

CHAPTER TWO

'BEETHOVEN'

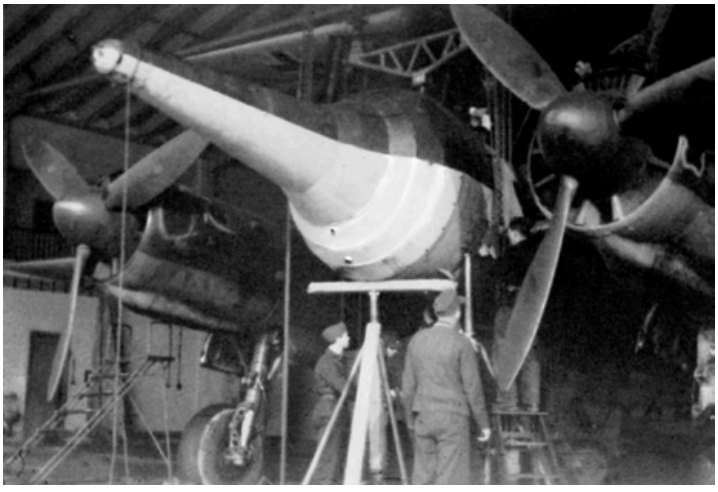
Flugkapitän Siegfried Holzbaur (standing to left) was recognised as the 'Father of the *Mistel*'. His passion for aviation started as a child when he scratch-built wooden models of aircraft. Later, he studied mechanical engineering and aircraft construction, and during the 1930s participated in numerous major aeronautical sporting competitions and rallies in which he won several awards. Between 1933 and 1945 Holzbaur flew more than 70 different types of aircraft, including the Ju 86, Ju 87, Ju 288 and Ju 287 jet bomber prototype, as well as the Me 262 jet fighter and the Ar 234 jet bomber

In 1939 Siegfried Holzbaur, a young flight-test engineer and test pilot working for Junkers at Dessau, formulated the idea for developing a so-called '*Grossbombe*' whereby a large bomb would be delivered to a target – such as a ship – by a smaller aircraft mounted on top of the bomb's uppersurface or even partially embedded into it. It was intended that the bomb would be of the simplest practical design, thus incurring the least cost. This combination was to have taken off by means of a trolley and was to have been powered in flight by two jet engines. Following its approach to its target and separation from the bomb, the control aircraft would return home. The idea never saw fruition, but Holzbaur continued to evolve the concept.

So it was that at the end of December 1941 Holzbaur prepared a report for the Junkers' project office in which he proposed mounting a small aeroplane above a larger, explosive-filled aircraft that would be used to control, aim and release the latter at a target. The weapon could be used to strike at a heavily armoured target such as a battleship or gun emplacement. For the upper component, it was suggested that a fighter aircraft, such as the Bf 109, be used as it would be able to make good its escape at high speed upon separation. It could also defend itself if attacked by hostile fighters. For the lower component, Holzbaur proposed using 'weary' Ju 88 bombers whose airframes and engines had reached their maximum permissible service hours and were thus expendable. In addition,

he proposed replacing the autopilot with a three-axis control system and a gyro-stabilised sight. Unfortunately for Holzbaur, the project office judged his proposal to be 'a waste of time'.

For the next 18 months, despite support from some senior bomber officers in the Luftwaffe, no further progress was made, or much interest shown, in Holzbaur's proposals by the RLM.



A cone-shaped hollow-charge warhead is hoisted up for attachment to the forward bulkhead of a Ju 88 converted for deployment as a *Mistel*. This enormous charge, measuring 1.8 metres in length and containing 1700 kg of high explosive, was known as the '*Elefantenrüssel*' (Elephant's Trunk). It was based on the development work undertaken by General-Ingenieur Dipl.-Ing. Ernst Marquardt and was designed to penetrate armoured steel or thick concrete

However, during the second half of 1943, General-Ingenieur Dipl.-Ing. Ernst Marquardt, the head of the RLM's GL/C-E 7 (the development section for bombs, mines and torpedoes), oversaw the design and manufacture of a very large hollow charge warhead intended to be fitted to war-weary bomber aircraft and deployed against 'tough' targets such as the armoured steel of a battleship or the reinforced concrete found on heavy gun emplacements and command bunkers, as well as industrial targets such as factories and power stations.

The cone-shaped *Schwere Hohlladung* (SHL) 3500 contained 1700 kg of explosive (a blend of 70 per cent Hexogen and 30 per cent Trinitrotoluene) packed into its main chamber, which was 1.8 metres in diameter and lined with a layer of soft metal, either aluminium or copper, behind which was a detonator. Protruding from the front of the cone was a 2.75-metre 'probe', known as the '*Elefantenrüssel*' (Elephant's Trunk). When this probe struck a target, the fuses would trigger the detonator behind the explosive charge. After firing, the charge would focus all of its force on the soft metal liner that would then become liquid and project forward in a fine jet. Travelling at more than 20 times the speed of sound, the jet could drill a hole through eight metres of armoured steel or 20 metres of reinforced concrete. A stand-off probe was necessary in order to allow time for the soft metal liner to form itself into a thin jet before impact. Once through the outer layer of a target, and thus confined within it, the jet of metal would vaporise anything in its path.

The length of the probe could be varied to trigger the charge at the optimum distance from the target. When used against armoured steel, it could be as long as 2.75 metres, but for less-well-protected targets, the length was considerably shortened. Broadly speaking, the greater the distance between the charge and the target at detonation, the thinner and deeper the hole drilled; the closer to the target, the wider and shallower the penetration. The entire detonation procedure took place within a 10,000th of a second.

During the early development of the SHL 3500, Marquardt cooperated closely with Dr.-Ing. Fritz Haber, an aircraft design engineer employed by Junkers who had been appointed to coordinate development, construction and testing of an even larger version of Stamer's *Mistel* concept, this time mating a Bf 109 with a Ju 88 bomber. To what extent Haber worked with Holzbaur, who had by this time risen to become a senior test pilot within

Junkers and been awarded the title *Flugkapitän*, is not clear, but progress was at least being made, and that must have been satisfying for Holzbaur whatever the case. Haber recorded;

'Attention was given to the design of the desired explosive charge. At first, plans were made to fill the wing or fuselage of the carrier aircraft with explosives. Specialists, however, voiced the opinion that this method would not be effective because it would be difficult to detonate all of the explosives at the same time, the part initially detonated blowing apart the remainder. They also considered that the proposed method of packing the explosive would be ineffective against armoured vehicles. The specialists at the RLM, therefore, were presented with the unique chance of creating an explosive charge without having to take into account its ballistic shape and size – characteristics normally needed when designing a free-fall bomb. This warhead was, in effect, an oversized *Panzerfaust*, which was capable of penetrating armour plating 120 cm thick. If built as a normal bomb, it would have had a length of six to seven metres.'

On 17 June 1943 the DFS had presented the following report detailing how a Bf 109/Ju 88 *Mistel* could be used;

'The *Mistel* combination offers the possibility of using the Ju 88A-4 as an unmanned *Grossbombe* remotely controlled by the Bf 109F to a target on a predetermined glide path. With a range of 1500 km, the *Mistel* can deliver a 3.5-ton payload of high explosives. Such aircraft can be stripped of all unnecessary equipment and can therefore carry substantial amounts of explosives. This method has the advantage that the fighter can remain outside the range of the anti-aircraft guns of a sea target since it can disengage its payload from out of range of said anti-aircraft fire and escape due to its superior speed from any pursuing fighter cover. Another advantage is that such a mission requires only one pilot.'

Indeed, this was a vision shared by Oberleutnant Dipl.-Ing. Horst-Dieter Lux, a Luftwaffe technical officer and very qualified pilot with experience on many different types of aircraft, who had been assigned to the *Mistel* development project on the strong recommendation of Oberst Dietrich Peltz. The latter was the highly decorated commander of IX. *Fliegerkorps* who had previously given his support to Holzbaur's proposals. Echoing the vision of Holzbaur, Lux recalled;

'In 1941 and 1942, the Luftwaffe lost approximately 25 aircraft and crews for one ship sunk in the Mediterranean. The ratio threatened to grow worse and only a new tactic for attacks on ships from the air based on an innovative weapon could improve the situation. The answer came from a look at the Japanese kamikaze operations. One aircraft/one weapon could sink a ship, but it also demanded the sacrifice of a human pilot. While the loss of one aircraft for the chance to destroy one ship was completely acceptable, the price of a human was not. Japanese mentality may have allowed that, but German mentality could not. The pilot had to be saved.

'After several ideas, such as ejection from the aircraft with rescue by a submarine, the final concept emerged. The pilot had to fly home. His aircraft would be a fighter mounted on top of a larger bomber which would be unmanned and carried the warhead. The combination of the two aircraft had to be controlled and piloted from the fighter cockpit. For the actuation of landing gear, flaps, throttles and especially the elevator,

ailerons and rudder, a "fly-by-wire" system had to be developed. It was not without risk.'

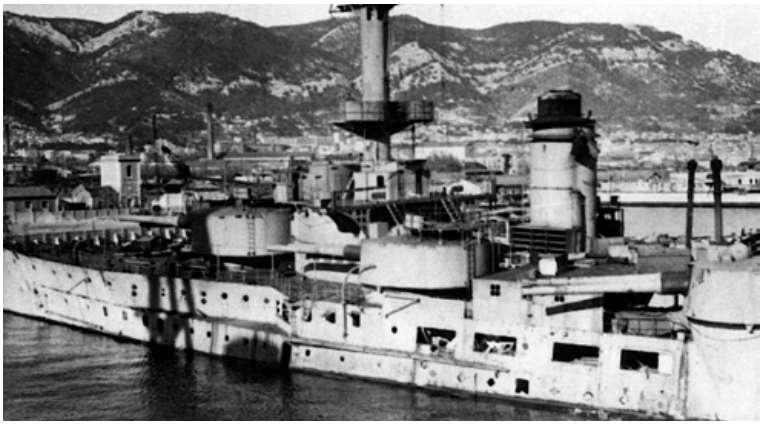
In July 1943, under the codename 'Beethoven', Haber and a small team of mechanics and fitters set about assembling a Bf 109/Ju 88 combination in what Lux described as an environment that was 'small, secluded, with extremely tight security and limited access'. The Bf 109 rested on two three-legged support structures and was fastened with spherically aligned bolts. The structures were attached to points on the front and rear spar joints and to the Ju 88's fuselage. Another attachment was made in front of the tailwheel well of the Bf 109 via a collapsible strut that enabled the fighter's incidence to be increased during separation. The collapsible strut was attached to the Ju 88's fuselage. The Bf 109 was fastened to the support by means of explosive bolts. On separation, only the bolt keeping the collapsible strut straight was detonated by the pilot. The subsequent increase in the angle of incidence of the Bf 109 operated a switch to command the detonation of all three bolts holding the aircraft.

The prototype 'Beethoven' combination, seen here, used Bf 109F-4 'CI+MX' coupled with a Ju 88A-4 and underwent flight trials at the DFS at Ainring from late 1943. The tests proved favourable, with performance, control and functioning all acceptable

The Ju 88's engines were throttled mechanically from the Bf 109 via a linkage system, which, during release, was also explosively separated. Two dual-function instruments, indicating engine manifold pressure and engine speed (rpm), were fitted to the Bf 109 to monitor the performance of the Ju 88 engines. The electrical connections between the two aircraft were made with two multi-pin shear connectors, their halves being secured by locking wire to prevent inadvertent separation. A flight control system enabled the combination to fly under the control of the Bf 109. Directional and lateral control commands to the Ju 88 could be effected the same way as if a pilot was physically sitting in the cockpit of the bomber flying the aircraft.

While attached, the Bf 109 drew its fuel from the outer right wing tank of the Ju 88. An emergency fuel line leading to this tank was connected to the drop tank fuel line of the Bf 109. The Ju 88's fuel pumps were more than capable of meeting fuel flow demands. It was intended to fit a limit switch to the Bf 109's tanks to ensure that they were completely full before separation took place, but by the time preliminary flight trials had been completed in February 1944, this had yet to be installed. Other modifications still requiring completion at this time were an installation for jettisoning the strengthened undercarriage of the Ju 88 by the Bf 109 during operational conditions and the installation of the Bf 109-operated, electro-hydraulic landing flap actuators in the Ju 88.

Meanwhile, under the direction of Gen.-Ing. Marquardt, static tests had been carried out with the SHL 3500 warhead against old French warships captured by the Germans at the naval port of Toulon, in southern France. In order to make the 'target' more representative of modern warships, additional ten-centimetre steel armour plate had been fitted. A charge was fastened to the two main gun turrets of the battleship *Océan* (formerly the



One of the old French warships captured by the Germans at the naval port of Toulon, in southern France, which was used as a target for experiments with the SHL 3500 hollow-charge warhead in late 1943

Jean Bart), and when it was detonated the warhead drove through the additional armour, through the 30 cm armour of the first gun turret and out the opposite side, which was of a similar thickness, and through the armour plating of the second turret. The result was an effective total penetration of 28 metres through the ship. Simultaneously, in East Prussia, successful experiments had been carried out in which a hollow charge warhead blasted through 18 metres of concrete.

Working with Marquardt and technicians from the Luftwaffe, the team at Junkers devised a process whereby a warhead with a similar capability could be fitted to a purpose-converted Ju 88 with relative ease by specialist Luftwaffe armourers in operational conditions. To facilitate this, a Ju 88 would have its crew compartment removed at the cockpit bulkhead, this process being carried out at a conversion facility run by Junkers. Four spherically aligned quick-release bolts were fitted which allowed the crew compartment to be re-installed for training purposes or for ferrying to an operational airfield. Once delivered to an operational unit, the crew compartment would once again be removed and the warhead fitted, again using the quick-release bolts. This process – taking approximately one day to complete – required a team of six mechanics, two armourers and a crane capable of lifting four tons. After the warhead was attached, the composite had to be towed to the takeoff position because the pilot of the fighter could not operate the brakes of the Ju 88.

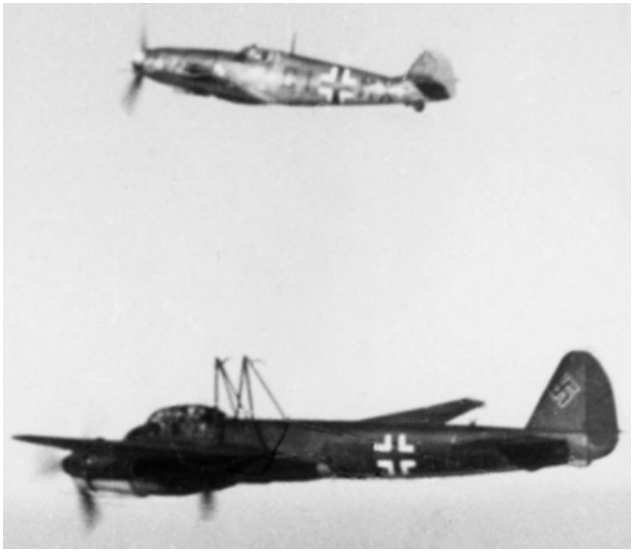
In a report for the DFS on the Bf 109/Ju 88 *Mistel* prototype dated 9 February 1944, Dipl.-Ing. Rudolf Ziegler described the flight-testing;

'The handling characteristics of the *Mistel* are similar to the Ju 88 in cruising flight, on takeoff and landing and during instrument flying, apart from sluggishness caused by the extra weight. The performance of the combination, particularly during takeoff, is better than that of the Ju 88 by itself. The *Mistel* in cruising flight is 50 km/h faster than the Ju 88 alone. The central position of the Bf 109's engine allows the combination to be flown without difficulty even when one of the Ju 88's engines fails.

Smoke spirals into the sky after a trial detonation of an SHL 3500 hollow-charge warhead affixed to the hulk of a captured French warship, possibly the battleship *Océan*, at Toulon in late 1943

'Ten separations were made at speeds of between 300 km/h and 550 km/h during the course of the trials. The rapidity with which the separation can be

accomplished is strongly dependent on the incidence setting of the Bf 109's tailplane, and this can, at high speeds and in situations where the aircraft is trimmed tail down, lead to structural damage to the Bf 109 during separation. The aircraft was, therefore, trimmed according to the speed at which it was flown. It is recommended that the Bf 109 should always be trimmed nose down, with a tailplane setting of 1.5 to 1.7 degrees. At high speeds the Bf 109 will then lift off when the explosive bolts are detonated, without hesitation and without additional control movements. At lower speeds, however, the Bf 109 will only lift off after detonation of the bolt holding the collapsible strut straight, when the aircraft is rotated by elevator movement to a high angle of incidence.



The explosive attachment bolts released, Bf 109F-4 'CI+MX' pulls away from its Ju 88A-4 'mate' during flight tests at the DFS at Ainring in late 1943/early 1944. Because of the incidence setting of the Bf 109's tailplane, at high speeds when the aircraft was trimmed tail down, there was a risk of structural damage to the Bf 109 during separation. Therefore, it was recommended that the Messerschmitt should always be trimmed nose down, with a tailplane setting of 1.5 to 1.7 degrees

'The Bf 109's acceleration at separation on these occasions lies between +3 and +4g and -2g. A short, sharp shock is also noticeable in the Ju 88 during separation. The acceleration experienced by the Ju 88 at a speed of 550 km/h is between +1.2g and +2.5g – i.e. the Ju 88 also diverges from and lifts parallel to its flight path as if it had been struck by a gust of wind.

'Twenty-five test flights were conducted with an autopilot. During the last flight, the system was, apart from some minor problems, still operating sufficiently well to be able to accept the results of this test. The *Mistel* could be flown without difficulty by the Bf 109 with the autopilot set to "cruise". The evaluation and selection criteria for the pilot of the Ju 88, however, must be established beforehand, because the characteristics of the Ju 88 are predominant. A series of takeoffs and landings with the autopilot switched on were made solely under the control of the Bf 109. The takeoff of the combination, because of its higher inertia, is more pleasant than that of the Bf 109. There is also no tendency for the combination to break away from its flight path when the Bf 109's engine is opened up to full power. Even the landing of the combination with the autopilot switched on is not particularly difficult.'

Lux recorded;

'I made the first flight about two months after the start of the programme. The development of the "fly-by-wire" system formed the bulk of the flight-test programme. Stability and control ran a close second, followed by tests to establish safe separation of the two aeroplanes over a wide speed range, from stall to maximum speed. A single-channel "fly-by-wire" system is a hazard in itself, but in 1944 it was strictly luck if there were no upsets. Mostly there were, ranging from sudden hard-overs and instability to explosive bolts which did not explode.'

A view of the V-shaped central attachment of the support structure fitted to the top of the Ju 88A-4's fuselage aft of the cockpit in the Bf 109F-4 'CI+MX'/ Ju 88A-4 composite

The front left main attachment point as fitted to the underside of the Bf 109, showing the spherical-jointed fuel connection and throttle linkage. This is how the structure would appear either before attachment or after separation of the two components

According to Haber, however, when it came to separation, things were not that problematic;

'The relative size of the aircraft chosen to form the *Mistel* proved favourable. It was obvious that during the separation of a very small aircraft from a much larger one, there would be negligible disturbance, whereas on separation of aircraft of equal size the disturbance would be very noticeably large. The relationship of 1:3 in the size of the Me 109 relative to that of the Ju 88 was regarded as small.'

The first trials using a *Mistel* combination fitted with a live warhead took place in February 1944 from the experimental field at Peenemünde-West on the Baltic coast. The *Mistel* was towed out by a heavy tractor from a remote, 'secret' hangar screened from casual view by a high wooden fence. In attendance to observe the tests were two influential and highly successful Knights' Cross-holders – Oberst Peltz, now filling the roles of *General der Kampfflieger* and the *Angriffsführer England*, with responsibility for the bombing campaign against the British Isles, and one of the Luftwaffe's most experienced bomber commanders, Oberst Werner Baumbach, the *Inspizient der Kampfflieger* for the RLM, a position in which he was responsible for the development and testing of new guided weapons.

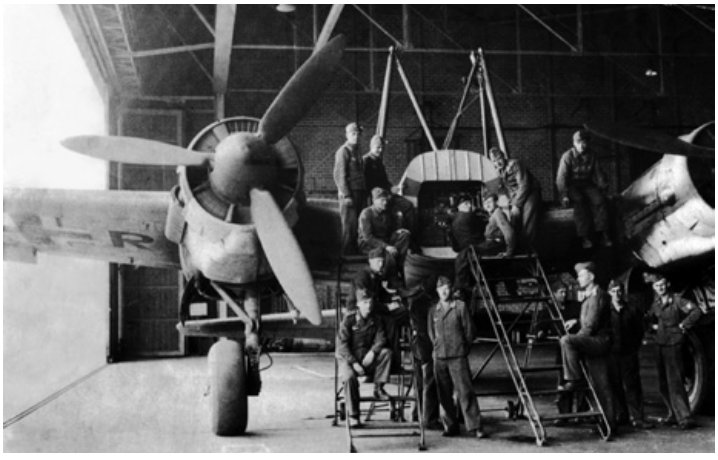
Piloting the composite was *Flugkapitän* Siegfried Holzbaur. As has been described, he was a main driving force behind the development of the *Mistel* and its eventual operational employment with the Luftwaffe. The composite made a faultless takeoff and climbed to rendezvous over the sea with its Ju 88 escort, before heading for the 'target' – a 110-metre high chalk cliff on the Danish island of Møn, 120 km to the northwest of Peenemünde.

With all three engines running smoothly, instruments functioning normally, dead on course, Holzbaur put the *Mistel* into a steady climb as it approached the southern-most point of the island of Rügen. Suddenly, the composite lurched in the air and the Ju 88 felt as if it was pulling towards the earth. Holzbaur wrestled with the controls and tried to throttle back the engines in an attempt to correct his course, but the machine refused to respond. Locked together, the two aircraft began to dive unalterably towards Rügen. Holzbaur could only attribute the situation to a break in the electrical feed in the Bf 109's autopilot and decided to enforce an emergency separation. Fritz Haber remembered the incident;

A view of the attachment of the three-legged support structure to fuselage frame 9 of the Ju 88 lower component of the Bf 109F-4 'CI+MX'/Ju 88A-4 composite, codenamed 'Beethoven'

'The aircraft suddenly began to dive out of control, for reasons which, even today, have still not been determined. Holzbaur could not bring the composite back under control and he was faced with no other alternative but to separate his aircraft, which he did quickly, leaving the consequences of his action to fate.'

The explosive-laden Ju 88 plummeted towards Rügen and smashed into the ground just three kilometres from the village of Thiessow. There was a flash of flame, a loud blast and, a moment later, a mushroom-shaped cloud of smoke that rose 900 metres into the air. For reasons of security, the RLM later concocted a cover story of a bomb-laden Ju 88 crashing in the area, and it even 'buried' the 'dead air crew' in a mock funeral with full military honours. For his part, Holzbaur concluded the only possible explanation for the *Mistel*'s failure was that in the narrow confines of the Bf 109's cockpit he had inadvertently cut out the main guiding mechanism, causing the Ju 88 to fall out of control.



A Junkers technician glances over his shoulder at the camera during an instruction class for Luftwaffe armourers on the fitting of a 1700-kg '*Elefantenrüssel*' hollow-charge warhead to the cockpit bulkhead of a Ju 88. The Ju 88 has already had a *Mistel* support frame fitted to the top of its fuselage. From the underwing letter visible and from other photographs in this series, it is possible that the Ju 88 is 'CR+CF', an aircraft test-flown at Nordhausen on 13 and 14 August 1944 as the lower component coupled to Bf 109 'CI+MY'. A warhead could be fitted with relative ease by trained Luftwaffe armourers. To facilitate this process, four spherically aligned quick-release bolts (the upper two of which are just visible) were fitted to the bulkhead for speedy removal of the crew compartment. The removal of the cockpit and fitting of the warhead took approximately one day and required a team of six mechanics, two armourers and a crane capable of lifting four tons. After the warhead was attached the *Mistel* had to be towed to its takeoff position because the pilot of the fighter could not operate the brakes of the Ju 88

A second test on 25 May directed at the same 'target' produced unsatisfactory results. The composite separated but the Ju 88 fell into a vertical descent and missed the target by 40 metres, whilst the lateral deviation amounted to 100 metres. It apparently crashed into the cliffs some 75 metres from the target and exploded, causing 'a high column of fire and smoke'.

The all-up weight of the operational *Mistel* (one fitted with a warhead) was about 20,000 kg, some 7000 kg heavier than a standard Ju 88 and thus approaching the load limits. This placed heavy demands on the undercarriage, which needed to be completely redesigned. Ultimately, no such modifications were carried out, and the undercarriage would become extremely prone to collapse on takeoff. Indeed, a safe takeoff could only be attempted from well-maintained concrete runways. Even a minor imperfection on a runway's surface could have had dire consequences for the machine and its pilot. Later in the war, *Mistel* were fitted with large tyres that were rated as high as 23.4 tons for takeoff so as to avoid 'blow-outs' when touching down. However, a combination fitted with a warhead was impossible to land once in the air, so the only choice left open to the pilot in an emergency was to jettison the complete lower component.

Another problem was the time lag between the fighter's pilot operating a control and the autopilot relaying this to the bomber. The Ju 88 always had a tendency to swing on takeoff, and this was magnified by the delay in the time needed by the *Mistel* pilot to correct it. Worryingly, it was not unknown for the combination to swerve off the runway on takeoff, and it was impossible to fly the *Mistel* in tight formation due to the same problem.

Fritz Haber recalled another key aspect of the *Mistel*;

'Another important item of the *Mistel*'s equipment was the gyro-stabilised sight. This, once aligned with the target, was capable of remaining "locked on" to the target. The principle of its operation is explained by the following example. Assume two points, each travelling at constant speed along two different, straight, convergent paths, meet at

Luftwaffe armourers prepare the rear connections of a hollow-charge warhead prior to being fitted to a Ju 88. The Hexogen/Trinitrotoluene compound explosive and detonator for the main charge was loaded into the rear of the warhead

the same time where the paths intersect. When the two points are joined by a line at any particular instant in time, it will be noticed that these lines are parallel to one another.

'As the aircraft flies towards its target, these "lines-of-sight" move forward parallel to each other. It is, therefore, apparent that the line-of-sight does not coincide with the aircraft's flight direction or its longitudinal axis – i.e. the aircraft is not flown along the line-of-sight. This situation leads to the requirement that the line-of-sight must not be fixed relative to the aircraft's axes and is fulfilled by the use of a gyro-stabilised sight, whereby the line-of-sight is always aligned with the gyro's axis. It is well known that the axis of a gimbally mounted gyro rotating at very high speed does not move from its initial orientation. Therefore, the aircraft can be rotated around any of its axes and the alignment of the gyro's axis, and hence the line-of-sight, will not change. Thus the requirement allowing movement of the line-of-sight relative to the aircraft's axes is fulfilled.

'Target acquisition is achieved by initially locking the gyro's axis, and thus the line-of-sight, and aiming the aircraft at the target. The pilot then frees the gyro and afterwards has nothing more to do than align and maintain the target in the sight's reticule. He has then achieved the situation with the correct lead angle. It is clear that in this situation, where the target is continually being tracked, the upper aircraft can be separated at any time because the overall situation will not alter. This is the basic difference between this method of target acquisition and other methods, in which separation must be carried out at a specific time in order to avoid [aiming] errors.

'Refinements were made to the system to reduce the time needed for target acquisition and to reduce its sensitivity, but these did not alter the method described here. The whole method proved extraordinarily simple and required little training in its use, as demonstrated by a number of pilots, who, after making only three or four target acquisition training flights during their first flight with the *Mistel*, went on to complete successful operations. The simplicity and certainty of hitting a target using the *Mistel* method was based on the premise that the carrier aircraft continued to fly in a straight line, and did not have to rely on the calculation of lead angles needed for ballistic flight.'

A Luftwaffe armourer leans back to hoist a warhead unit up towards its attachment points on a Ju 88. Chains were fitted to lifting lugs around the warhead for this purpose. Note the four small fuse tips protruding at the end of the warhead cone or '*Elefantenrüssel*'

Eventually, following the initial tests from Peenemünde, the first examples of the still largely untried *Mistel* were handed over to the Luftwaffe for training purposes. This task fell to the *Einsatzstaffel*/KG 101, which had been formed in January 1944 at Varrelbusch under the command of Oberleutnant Horst Rudat. A Knight's Cross-holder, he had flown He 111s with KG 55 before taking up a post on Peltz's

staff as liaison officer to IX. *Fliegerkorps*. Together with four or five other pilots from the *Einsatzstaffel*/KG 101, Rudat journeyed to the Junkers works at Dessau to meet with Holzbaur. As he recalled;

'Because of tight security measures, I had never previously heard anything about the *Mistel*. I therefore flew to Dessau to receive detailed information about the type, and from there headed to Nordhausen. On arrival, I found that initial flight-testing of the *Mistel* had already begun under the leadership of Holzbaur and Haber, both of whom were regarded as the "Fathers" of the *Mistel*.'

By this time Ju 88s were already arriving at Nordhausen airfield for refurbishment and assembly into *Mistel* by the *Baustelle Schwab/ Nordhausen*, where Holzbaur had established a Junkers coordination office. The military airfield had no connection with the infamous nearby slave labour complex.

Under the supervision of Holzbaur, Haber and Lux, Rudat and his small detachment began training;

'I had already had some experience flying the Ju 88 but had not previously flown the Bf 109. Instruction on the Messerschmitt was brief. A few days later I made my first flight with the *Mistel*. I have to admit that I did not feel very confident sitting high above the ground in a Bf 109 mounted to a Ju 88. Takeoff proved to be a problem – control commands electrically transmitted from the upper to the lower aircraft seemed to take rather a long time reaching the Ju 88's control surfaces before they responded to the command. The pilot, therefore, had to anticipate every manoeuvre before it actually took place.

'During training with the *Mistel* S1 [S for *Schule* (School)], the Ju 88 was flown with a two-man crew who were able to correct any bad mistakes made by the pilot of the Bf 109. Everything turned out well, and after takeoff I was surprised to find how easy it was to control a large composite aircraft from a small fighter cockpit. I was particularly impressed by the accuracy of the three-axis, gyro-stabilised autopilot. During mock attacks, very little control movement was needed to keep the composite on course towards its target – a tree – once the aircraft had reached its optimum speed. Naturally, the greatest surprise was the feeling I had when I flipped the switch to separate the Bf 109 from the Ju 88. Thus was my first experience with the *Mistel*.'

However, Rudat soon realised that the facilities at Nordhausen did not offer the most practical or efficient environment in which to continue training his pilots for offensive operations. In the spring of 1944 Rudat transferred to Kolberg, on the Baltic coast. Equipped with about a third of the initial batch of 15 *Mistel*, he carried out the first aiming trials against the cliff at Møn.

Oberleutnant Friedrich-Karl Gottgetreu was a former bomber pilot from Do 217-equipped IV./KG 2 who, in early 1944, was transferred to 1./KG 101;

'Up to this time, I had only the vaguest idea of what it was all about, since the existence of the unit was supposed to be secret. When I first saw the *Mistel* at Kolberg inside a hangar I was very impressed with the concept of a "flying bomb". I just stood there and stared at it in awe and tried to visualise how it would be to fly one of the things. I considered the *Mistel* to be a technically and tactically able aircraft, but in retrospect I have to admit that its performance

Hauptmann Horst Rudat was appointed commander of the *Einsatzstaffel*/KG 101 in January 1944. Having joined the Luftwaffe in 1938, he had spent his initial operational career with KG 55. Rudat became *Staffelführer* of 2./KG 55 and took part in missions over Stalingrad that earned him the Knight's Cross for his remarkable feat of flying out 22 wounded soldiers from the encircled German 6th Army pocket. He was appointed *Staffelkapitän* of 2./LG 1 in May 1943, converting from the He 111 to the Ju 88. In October of that year he was transferred to the staff of the *General der Kampfflieger*, from which he was assigned to KG 101. Rudat would fly a total of 354 combat missions, 337 of them in the East

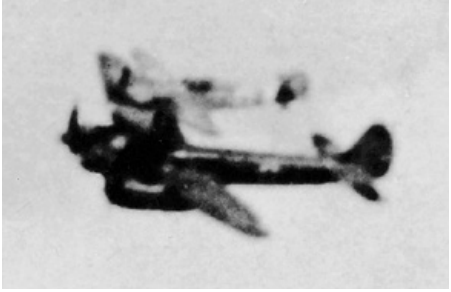
Civilian technicians attend to a newly fitted *Mistel* S1, probably photographed at the *Baustelle* Nordhausen in early 1944. Unfortunately, the quality of the image does not allow identification of the emblem on the Ju 88 or a reading of the *Werknummer* on the tailplane. However, the partial codes 'TZ' and 'KR' are visible on the Bf 109 and Ju 88, respectively

left a lot to be desired. Its qualities lay in the enormous destructive power of the warhead and in the upper component becoming an operational fighter after separation. The weaknesses lay in its weight, which really required smooth concrete runways for takeoff, and its easy exposure to enemy action on account of it being not very manoeuvrable in the air.

'Conversion to the *Mistel* consisted, first of all, of a few familiarisation flights with the Bf 109F, then up to about six flights at the controls of the lower component of the S1 – a Ju 88A-4 – with the Bf 109 separating each time. Finally, you flew the S1 from the top component, a very tricky task at first. Again, it took a few flights to get used to the height above ground during takeoff, the separation in flight being uneventful. Flight training was interspersed with ground school, dealing mostly with Bf 109F cockpit operations while attached to the Ju 88A-4.

'Following conversion training at Kolberg, I was transferred to 1./KG 101 at Rhein-Main, from where we were supposed to fly missions to the invasion coast. We were quartered with local civilians around the airfield and driven daily to the old tower to await orders. I cannot remember too much of my time there, but one thing sticks in my mind – there was always talk about targets on the French coast, especially ships.'

An early Bf 109/Ju 88 *Mistel* during a flight test at Nordhausen in early 1944. Oberleutnant Dipl.-Ing. Horst-Dieter Lux, the Luftwaffe technical officer assigned to the *Mistel* test programme, recalled that the main problems to be overcome were the risk of the combination suddenly turning during flight, instability and malfunctioning explosive attachment bolts



Feldwebel Rudi Riedl was a fighter instructor whose school had been disbanded in June 1944. Although he joined the *Mistel* training programme later than Gottgetreu, his experience is typical. With some specialist training in using Bf 109s and Fw 190s to attack pinpoint targets under his belt, Riedl was sent to Kolberg, where his first encounter with the composite left him awe-struck;

'When I saw my first *Mistel* – which was a training variant, I thought "How the hell am I going to handle this monster?" I had to sit in the cockpit for a long time to get a feel for the machine – to understand how it worked and to come to terms with how high up I was. Eventually, however, after having checked out the instrumentation and controls, I began to realise that perhaps it was not going to be so difficult after all. But when

I later saw the operational variant with that warhead mounted I was absolutely astounded! I thought, "How am I going to handle this? There is no other crew except me!"

'Starting and taxiing the *Mistel* was hard. It was a real beast. Visibility was very restricted. Because of the height and angle at which the machine sat on the ground, you could only see the end of the runway when the tail came up and you were ready to lift off. Also, often when manoeuvring and turning into the takeoff position, the tailwheel was known to come off and that was when there were accidents – machines slewed off the runway. But once the machine was airborne, there was no real problem. A little sluggish perhaps, but that was all. It has to be remembered that we were all experienced pilots – former instructors – not novices. In flight, the *Mistel* handled comparatively well, very much like any other twin-engined bomber. The Junkers technicians who worked on matching the controls of the upper and lower components did a fantastic job.'

Riedl made a total of ten training flights in the *Mistel* at Kolberg, which was considered to be the standard number prior to embarking on operations. Six of these flights were aiming exercises, following which the complete composite returned to base. The remaining four flights involved separation exercises during which there were occasional accidents. At the moment of separation, the natural inclination of the pilot in the upper component was to push the stick forward, causing the propeller blades of the fighter to strike the pilot of the Ju 88 with fatal results. In more than one training separation the upper component collided with the Ju 88 because of this, causing the fighter to fall forward.

Oberfähnrich Georg Gutsche of III./KG(J) 30 was a very experienced bomber pilot, who underwent training on the *Mistel* in early 1945;

'We had barely become familiar with all-weather flying and blind landings when we were ordered to convert to the Fw 190. Our fighter conversion ended quickly, and at Prague-Ruzyne we were confronted with a "flying contraption" for which we could see no use. It consisted of a Ju 88 with an Fw 190 mounted on three supports. The cockpit of the Ju 88 was manned by a training crew, while the pilot of the Fw 190 climbed into the cockpit by means of a five-metre ladder. After I had made a few flights in the cockpit of the Ju 88, I found that the contraption was relatively easy to fly and to land. The same was also true for the pilot of the Fw 190, who, after all, had to steer the *Mistel*. This was made possible through the electrical steering connections that were located inside the three supports.

'During training flights, the pilots were able to communicate with each other. The Fw 190 pilot could control the flaps, the trim and the propeller settings, as well as the fuel tank pumps and the Ju 88's throttle. All the Ju 88's rudders could be manipulated so easily it was as if one were only flying the Fw 190. Stick synchronisation was outstanding. However, as the pilot of the Ju 88, I was seriously concerned about the fact that the propeller of the Fw 190 was only 20 cm above my head! During a hard landing the supports could collapse and the propellers could cut through the cockpit and smash into the head of the pilot. Such a case did occur, despite especially reinforced supports for the fighter.

'Practice flights were not only designed to allow pilots to master flying the *Mistel*, they also included attack exercises against ground targets. The

Feldwebel Rudi Riedl began his Luftwaffe career as a mechanic and served initially with *Stukageschwader* 77. He saw service in Poland and France, before commencing flying training as an Unteroffizier at the FFS A/B 7 at Plauen, where he trained on He 111s, Ju 86s, Do 17s and Ju 52/3ms. In September 1941 he was transferred to the FFS C 9 at Pretzsch, northwest of Torgau on the Elbe, where he trained as a blind-flying instructor. In December 1942, whilst at BFS 1 at Waldpolenz/Brandis, he qualified to instruct on Ju 52/3ms, Ju 86s and Ju 88s. In early 1943 Riedl was promoted to Feldwebel and returned to Pretzsch to the (renamed) FFS B 9, where he served as an instructor until June 1944, when the school was disbanded due to a lack of fuel. He was then posted to the *Jagdfliegerschule* at Stolp-Reitz and received fighter conversion training onto the Bf 109F and Bf 109G-12, as well as the Fw 190. The training specialised in attacking pinpoint targets. Riedl was thus the ideal candidate to become a *Mistel* pilot

Feldwebel Karl Russmeyer joined the Luftwaffe in July 1940, initially wanting to train to become a seaplane pilot. From Christmas 1940 through to July 1943 he underwent training at the FFS A/B 7 at Plauen, followed by the C-*Schule* at Bourges, in France, then BFS 6 in Wesendorf, where he flew the Ju 52/3m, He 111 and Ju 86. In July 1943 Russmeyer was posted to *Uberführungsgeschwader West* at Villacoublay, in France, where he flew many different types including the Ju 52/3m and Ju 88. In January 1944, he was transferred to IV./KG 30 at Aalborg, in Denmark, with whom he underwent tactical and operational training on the Ju 88, before moving six months later to 3./KG 30, which was equipped with the Ju 88S-3. The *Staffel* moved to Le Culot, in France, in July 1944, and for most of July Russmeyer embarked upon sorties off the Normandy coast against the Allied invasion fleet, before training to become a *Mistel* pilot

pilots had to fly at the target and aim by means of a simple crosshairs gunsight. The Fw 190 pilot would take over control by means of a switch. The target was approached at an altitude of 3000 metres, from a distance of three to four kilometres it was brought into the crosshairs of the gunsight and then the automatic targeting system took over. Normally, one course correction was necessary in order to hold the target in the crosshairs. The instructor pilot could see in his gunsight what mistake the student was making and could contact him via the intercom system. He could also take over the steering at any time. As soon as the target was in the crosshairs of the gunsight the Fw 190 pilot pushed the release button. In an emergency, the Ju 88 could be blasted off with small explosive devices. During the instruction period, the instructor pilot took over the lower aircraft.'

Feldwebel Karl Russmeyer was typical of the kind of pilot undergoing training on the *Mistel* at Prague-Ruzyne in early 1945, the 27-year-old having previously flown the Ju 88 in sorties against the Allied invasion forces off the Normandy coast with 3./KG 30. He recalled;

'After the invasion of France, every front was in inescapable retreat as the war wound down towards its bitter end. Our KG 30 was transferred to the Osnabrück area. On 19 September 1944, my crew, along with the others of our *Staffel*, flew its last mission on bombers. We attacked British troop concentrations near Eindhoven. Back at Achmer, we climbed down from our trusty Ju 88S-3 and we were all really depressed.

'Following a spell of leave, we began fighter conversion at Chrudim on 3 December 1944. I flew the Bf 109 and, finally, the Fw 190. Then, on 9 February 1945, we transferred to Prague-Ruzyne for conversion to the *Mistel*, or, as we knew it, the "*Nero*". When I first saw it, I was greatly astonished! I had no idea how I was going to fly it. Nevertheless, I regarded it as a challenge and got on with it. Of course, we weren't allowed to talk about the *Mistel* concept at the time, but my personal opinion was that it was a *Himmelsfahrt-Kommando* – a "Ticket to Heaven". A good idea, but dangerous – very dangerous.

'During training, we former pilots of KG 30 sat in the upper fighter and would make takeoffs so that we could get a feel for where we were in relation to the ground. When the Ju 88 pilot thought that the upper pilot had a good enough "feel", he was then allowed to take over control of the *Mistel*. During flight, you could feel movement between the two aircraft. This was due to the lack of stiffness of the truss structure joining the aircraft. Once training was completed, the upper pilot was then expected to train new pilots in a similar way. From the top seat there was very poor visibility of the ground. At least one of our pilots was killed during training when, upon the pupil making a heavy landing, the supporting struts collapsed through the shock of touch-down and the fighter's propeller cut into the cockpit of the Ju 88 and killed its pilot.'

By June 1944 it was fortuitous that the *Einsatzstaffel*/KG 101 was at a level of readiness at which it could commence operations, for just four months after the unit's formation its *Mistel* would be sent into action.

CHAPTER THREE

AN INAUSPICIOUS DEBUT

On 6 June 1944 Allied forces landed on the Normandy coast. An armada of some 6500 ships crossed the English Channel, supported by 12,000 aircraft. The Allied air effort during the first 24 hours of the invasion was immense, with the USAAF and RAF having sufficient capability to fly 14,500 sorties. By comparison, the performance of the Luftwaffe on the first day of the landings was woefully inadequate.

One of the German units hurled into France in the aftermath of the landings as part of a knee-jerk German reaction was the *Einsatzstaffel*/KG 101, whose *Mistel* would be slated to attack the enemy fleet in the type's baptism of fire. By 10 June the *Staffel*'s ground and signals personnel had arrived by rail and established themselves on an airfield near St Dizier, 90 km south of Reims. However, preparations to fly in the first 15 *Mistel* to France had begun at the *Baustelle Schwab*/*Nordhausen* several days earlier under the coordination of Siegfried Holzbaur. The latter called in Feldwebel Heinz Schreiber, a Luftwaffe acceptance and ferry pilot who had been testing Junkers' twin-engined aircraft on behalf of the RLM. Holzbaur assigned Schreiber the task of setting up the most efficient means of getting the *Mistel* to France from Nordhausen.

On 10 June Schreiber flew in a Ju 88 to St Dizier, arriving at the same time as the ground personnel of *Einsatzstaffel*/KG 101. Schreiber then returned to Nordhausen and reported his findings to Holzbaur. He believed that the runways and infrastructure at St Dizier were adequate to support

A row of three mission-ready *Mistel* S1s – numbers '1', '2' and '3' – of the *Einsatzstaffel*/KG 101 makes an impressive site at St Dizier during operations against Allied shipping in the summer of 1944. The *Mistel* appear to be on grass, but this is unlikely because of their weight. They are probably on a concrete taxi track that has been hidden by the long grass. The Ju 88 lower components carry large white numerals on their tailplanes, indicating aircraft that had previously been used by training units. Such numbering enabled instructors to easily identify aircraft and crews during training flights, and they were probably adopted as tactical numbers when used by KG 101. The composite to the far left, 'NA+YS'/'CN+FK', arrived at St Dizier from Nordhausen on 18 June 1944, having been delivered by a crew comprising the Luftwaffe acceptance pilot Heinz Schreiber, Feldwebel Willi Döhring from 2./KG 101 and Feldwebel Bäzner, who was a Luftwaffe flight engineer assigned to Junkers

Heinz Schreiber joined Junkers at Dessau in 1929. He completed his apprenticeship in December 1932, and on 18 June 1935 qualified as a flight engineer. On 14 March 1939 Schreiber became an acceptance test pilot for Junkers production aircraft. Upon joining the Luftwaffe in early 1940, he was posted to the FFS C 16 at Burg between May and July of that year, followed by the FFS C 9 at Altenburg in September. Schreiber then moved to BFS 6 at Wesendorf in October 1941, before joining *Uberführungs und Einfliegerkommando Jüterbog* on 13 August 1942. As a member of this unit, Schreiber was based at a number of Luftwaffe repair facilities behind the frontline and involved in the acceptance testing of aircraft that had either been repaired following battle damage or that had reconditioned 'war-weary' airframes – particularly Junkers-manufactured aircraft. In this capacity, he saw service in Athens, then at the Junkers plant at Leipzig-Mockau, and afterwards was assigned to facilities in Poland. In early April 1944 Schreiber returned to Dessau, where he was involved in testing the Ju 88, Ju 188, Ju 352 and, finally, the *Mistel*. He probably flew more *Mistel* composites than anyone else

Mistel operations, and that it would be possible for composites to fly directly there from the Nordhausen conversion facility. As early as 14 June Schreiber flew as co-pilot to Feldwebel Emil Degering in the Ju 88 of the first *Mistel* S1 to head for France, a combination made up with a Bf 109F-4 piloted by Feldwebel Bäzner. More aircraft quickly followed, flown in by ferry pilots.

Among the pilots of the *Einsatzstaffel*/KG 101 at St Dizier was Oberleutnant Albert Rheker. An experienced Ju 88 pilot who had previously flown over North Africa and Italy with the *Stabsschwarm* of I./KG 30, he had been awarded the *Frontflugspange in Gold* and the *Deutsches Kreuz in Gold*. Some time in the spring of 1944 Rheker was transferred to Kolberg, where he underwent training on the *Mistel*. One evening, according to family lore, while on a visit to Wiedenbrück, where he was born, and with beer flowing, he remarked, 'Tomorrow morning I'm going to surprise you. I will fly over Wiedenbrück with a special aeroplane – a "*Wunderwaffe*" (wonder weapon), the likes of which you will have never seen before'. Sure enough, according to the written recollection of a resident of Wiedenbrück, the next morning, with many of the townspeople lining the streets, 'a Ju 88 with an Me 109 on the top flew westwards'.

On the evening of 14 June 1944, Oberleutnant Rheker was briefed to fly one of the first *Mistel* missions against the Allied invasion fleet. Taking off from St Dizier, he made course for the Seine, and from that river towards the landing area. On patrol over the beachhead area that night, with the objective of scouting for any enemy aircraft which might interfere with Allied bomber operations and shipping, was Mosquito XIII HK476/'O' of No 410 'Cougar' Sqn, RCAF, based at Hunsdon and flown by Canadians Flt Lt Walter 'Dinny' Dinsdale and navigator Flg Off John Dunn. According to Dunn, HK476 was 'our favourite "Mossie", equipped with four 20 mm cannon and Mk VIII Air Interception [AI] radar'.

A tall ladder, providing access to the cockpit of the Bf 109, leans against the wing leading edge of the Ju 88 of this 'live' *Mistel* S1 that has the tactical number '2' applied to the rudder of the Junkers, probably in white. This number suggests an aircraft of the *Einsatzstaffel*/ KG 101, deployed in France in the summer of 1944

At 2325 hrs, Dinsdale and Dunn, guided by mobile GCI (Ground-Controlled Interception), were vectored south along the course of the Seine towards a possible enemy aircraft. Dunn recalled;

'We experienced a heavy concentration of Window [chaff] which flooded the cathode ray tube

with spurious blips or contacts. I was finally able to select a solid blip at a range of 2000 ft at 12 o'clock. I advised my pilot immediately, calling "*Contact!*" over the intercom, and we climbed to 11,000 ft, where a reasonable visual was obtained.'

The weather was good, with a few broken clouds, and Dinsdale was able to see his target quite clearly. It was moving so slowly that he was forced to lower his wheels and flaps in order to avoid overshooting. Dinsdale closed in from behind and below. Dunn concluded;

Flt Lt Walter Dinsdale (left) and Flg Off Jack Dunn of No 410 'Cougar' Sqn, RCAF, pose for a snapshot in front of a Mosquito, possibly their Mk XIII HK476/'O' – the machine in which they shot down a *Mistel* of the *Einsatzstaffel*/KG 101 over the Seine on the night of 14 June 1944. The composite aircraft they destroyed was almost certainly being flown by Oberleutnant Albert Rheker. Dunn remembered 'a massive explosion that lit up the whole countryside'

'Mobile GCI was advised of contact and visual, and "chatter" with GCI was cut off while we assumed contact. We then closed to 1000 ft astern of the Bandit, checked IFF [Identification Friend or Foe], no resins, no battle stripes. We closed to 750 ft and made positive identification with the aid of night glasses on a Ju 88 with what appeared to be a glider bomb attached to the upper fuselage. Identification was confirmed by my pilot – again with the aid of night glasses. Strangely enough, there was no evasive action taken by the bandit throughout this action. At 750 ft, my pilot opened fire with a short burst from our four 20 mm cannon, parts of the enemy aircraft burst into flames and it banked to port and went down in a steep dive. We followed on AI and visually. It hit the ground south east of Caen at 2340 hrs. There was a massive explosion that lit up the whole countryside. Hedges, roads and buildings were visible.'

The Canadians' immediate belief was that their target had been a type of airborne launching platform for a V1 flying bomb. However, what Dinsdale and Dunn had most probably shot down was the *Mistel* of Oberleutnant Albert Rheker, bound for the coast. 'It was a very awkward thing, and it lumbered along like an old hippo at about 150 mph', Dinsdale later told newspaper reporters. 'I recognised it as a Ju 88, but couldn't figure out what the thing on top was. I thought it was one of their glider bombs mounted in a new way. It was on top, mounted between the rudder and the main wing. My first short burst hit the starboard wing and cockpit of the Junkers. I thought I had killed the pilot, but, of course, there was no pilot as the whole thing is controlled from the fighter on top. Carrying on for a few minutes, circling to port with the fire increasing, he then dropped away and crashed behind the German lines. The explosion lit up the countryside for miles around.'

In Oberleutnant Rheker's *Leistungsbuch* (service record book), his *Staffelkapitän*, Hauptmann Rudat, noted for 14 June, '*Angriff auf Invasionsflotte* [Attack on Invasion fleet]. Oblt R has not returned from attack on enemy and is assumed as missing'. The baptism of fire had resulted in the first combat loss – but no Allied ships had been touched.

Mistel arrived at St Dizier in a trickle. On 18 June, Feldwebel Willi Döhring of 2./KG 101 ferried in a *Mistel* S1 (Bf 109/Ju 88A-4)

Oberleutnant Albert Rheker joined the Luftwaffe in November 1938. After training at the FFS C at Prague-Ruzyne and the *Große Kampffliegerschule* 2 at Hörsching, he joined LG 1 in August 1940, with whom he flew operationally over the British Isles in the Ju 88. Rheker transferred with III./LG 1 to the Mediterranean in early 1941, and between January and May 1941 he flew 27 missions from Sicily. Between May and December he flew a further 67 missions over North Africa and Greece, including anti-shipping sorties and bombing attacks on Alexandria and Port Said. From November 1942 to the summer of 1943, Rheker was engaged in anti-convoy flights in the Far North, before joining I./KG 30, with whom he returned to the Mediterranean. He was awarded the *Frontflugspange in Gold* on 17 March 1942 and the *Deutsches Kreuz in Gold* on 23 July 1943. This very experienced pilot would be killed flying a *Mistel* against the Allied invasion fleet in June 1944

accompanied by Feldwebel Schreiber, with Feldwebel Bäzner again in the Bf 109. The following afternoon, Schreiber and Bäzner crewed another S1 to France piloted by Feldwebel Schöppner. The problem was that ground support equipment at St Dizier was lacking, and without a heavy crane to mount and install warheads the groundcrews and technicians were forced to commandeer a large excavator for the purpose.

Attempts to begin operations in earnest began on the evening of 24 June, when it is believed that five of the 12 available *Mistel* were prepared for an attack to be conducted under pathfinder guidance from Ju 88s of I./KG 66 and fighter escort from I./JG 301. Their target was an Allied convoy in the Bay of the Seine that was reported to include the battleship HMS *Nelson*, which had been bombarding German positions around Caen and providing naval gunfire support against targets on the coast. In fact the vessel had already departed Normandy. Nevertheless, at St Dizier, with warheads fitted with their mix of Hexogen high-explosive and Trinitrotoluene, Oberleutnant Rudat prepared his aircraft for takeoff;

'After training, the experience with an armed *Mistel* was completely different. Apart from the certainty that in wartime somebody would always shoot at us, takeoff was the most difficult part of the mission. The Ju 88's tyres were designed for a takeoff weight of 12 tonnes – the *Mistel*, however, weighed at least 14 tonnes. In order to keep the weight of the composite to a minimum, all non-essential equipment was removed from the Bf 109 – and that included guns and radio equipment.

'Four aircraft took off successfully in the early evening, when encounters with the enemy's day fighters were no longer expected and before nightfighters made their appearance. The entire operation was cloaked in secrecy. German anti-aircraft batteries along our route were only informed of our mission at the very last minute and were ordered not to fire. It was my bad luck that one of these batteries had not been informed in time. We were still climbing when, at a height of 1500 metres, we came under fire. My left engine was hit and stopped. I remember the feeling of sitting on top of an enormous warhead and being shot at by our own flak. Because I was unable to feather the propeller of the dead engine, I lost speed rapidly and was unable to keep up with the other three *Mistel*. In the meantime it had grown dark.

'West of Le Havre, I noticed a British nightfighter and I became conscious of the fact that I had no means of defending myself – my guns had been removed. Because my Ju 88 tended to want to turn continually to the left, I decided to make a direct attack on the numerous landing craft saturating the coastline. Something would definitely be destroyed, even though I could not claim success for the destruction of a designated target. After aiming the Ju 88, I separated and immediately turned inland to escape the nightfighter.'

Fellow *Mistel* pilot Feldwebel Saalfeld experienced control difficulties and was forced to conduct an emergency separation. His Ju 88 crashed into the sea. A subsequent report by the crew of a Mosquito from one of the Air Defence of Great Britain squadrons operating over the beachhead who witnessed one of the *Mistel* that night stated;

'The larger aircraft turned over onto its back and dived straight into the sea, without showing any tendency to glide. It reached the sea in about

three seconds. On striking the water it caused a terrific explosion, three miles east of the convoy. The separation of the two aircraft appeared hurried and ill-judged.'

This may well have been a description of Saalfeld's aircraft.

Meanwhile, at least one *Mistel* was successfully launched at the enemy ships from a height of 245 metres. The bomber hit the sea and exploded close to HMS *Nith*, a 1370-ton River Class frigate lying at anchor off Gold Beach. 1Lt Peter Meryon was second in command of *Nith*, and from his open air position on the superstructure he watched the *Mistel* as it approached the ship. He recalled;

This is almost certainly the *Mistel* S1 that Flt Lt Walter Dinsdale and Flg Off Jack Dunn shot down over France on the night of 14 June 1944. Bf 109 'CD+LX' and Ju 88 Wk-Nr. 10130 White '5' was probably flown by Oberleutnant Albert Rheker of 2./KG 101, who was on assignment to the *Einsatzstaffel*

'I clearly remember that moonlit night, at action stations, hearing the droning of an enemy aircraft. Then I remember being aware of it aiming itself at us, then separating from the smaller aircraft above it. The aircraft continued on a descent towards us, causing an enormous explosion alongside the ship. Our sea boat was turned outboard at its davits ready for an emergency, and the wing of the plunging aircraft cut the boat in half, which gives some idea of how close the Ju 88 was when it hit the water.'

The *Mistel* had actually blown in *Nith*'s starboard side amidships and the entire length of the ship had been raked by steel fragments. Steam pipes in the boiler room had burst and the main generator had been put out of action. For a time *Nith* was without electricity, but working in almost complete darkness, the engine room artificer managed to activate the auxiliary power supply. Nine crew were killed and 27 wounded in the attack. Meryon remembered 'the awful sight of maimed bodies, blood and flesh which, of course, we had to clear up after ascertaining that the ship herself was sound and not sinking'.

For the rest of the *Einsatzstaffel*'s time in France, its operations were few and far between, and they also proved largely ineffective. A mission was flown in early July against Allied shipping involving four *Mistel* led by Rudat, and with an escort of Bf 109s from I./JG 301. When alerted to the attack, however, the Allies put up a smokescreen and the Germans were

A tow truck moves off, having moved *Mistel* S1 White '2' of the *Einsatzstaffel*/KG 101 to its start point on a summer afternoon at St Dizier in 1944. This *Mistel* would have been deployed against the Allied fleet off Normandy and in the Baie de la Seine

The 1370-ton *River* Class frigate HMS *Nith* was hit and severely damaged by a *Mistel* off the coast of Normandy on the night of 24 June 1944. The Ju 88 'bomb' blew in the starboard side of the vessel, raking it with steel fragments. The ship's generator was put out of action, plunging *Nith* into darkness. Nine sailors were killed and 27 wounded in the attack

unable to observe results, although later reconnaissance flights claimed that damage had been inflicted. In reality, this does not seem to have been the case. That week, the British Admiralty reported;

'Attacks on shipping were made in the Seine Bay area on some nights, but with little success. It had been known for some time that the Germans were experimenting with composite aircraft, and these have now been reported in action against Allied ships. There is good reason to believe the penetrative force of the warhead is exceptionally high, and that the enemy considers one hit capable of sinking a capital ship. The composite aircraft will unquestionably prove very vulnerable to fighter interception, and both it and its separate Ju 88 component should be easy targets for AA defences.'

A bombing raid by the US Eighth Air Force on St Dizier on 18 July failed to hit any *Mistel*. The next day a senior technician from the Focke-Wulf plant at Bremen journeyed to Junkers at Dessau, where he inspected the *Mistel* conversion line. This was probably with a view to using Fw 190s as *Mistel* upper components. In his subsequent report he stated;

'No difficulties have been found during flight-testing. The paired aircraft are being delivered with the Ju 88's usual cockpit. The installation of the warhead at the operational base takes five hours. While moving the Ju 88 on the ground, the aircraft is fitted with a seat slung below the fuselage from where the brakes can be applied by two hand levers. Flight with the warhead presents no problems. In order to guarantee separation, the rear support strut is designed to fold shortly before separation takes place. The resulting increase in the angle of incidence of the Me 109 substantially increases the lift (of that aircraft) and ensures clean separation from the Ju 88. According to the pilot, a particularly noticeable hard shock is felt at separation. Junkers is presently investigating whether the rear strut can be replaced by a simpler design.

'Care must be exercised with the mounting of the upper aircraft to ensure that no deviation to the approach to the target arises after separation because the lower aircraft will miss its target.

'All phases of the conversion of the Ju 88 were inspected. The fuselage is cut through at the position required for a new assembly joint. The forward and centre fuselage sections are fitted with new frames and four spherically aligned joints in an extension of the fuselage mating strap. All of the fuselage equipment is removed. The delivery cockpit is fitted with essential equipment only in order to simplify the interface with the fuselage behind the cockpit. A second, rearward-facing seat for a flight engineer is added behind that for the pilot. A switch and equipment panel is fitted to the forward part of the (*text continues on page 50*)

Groundcrew carry out checks to *Mistel* S1 White '4' of the *Einsatzstaffel*/KG 101 at St Dizier in the summer of 1944. Two men have climbed the ladder up onto the wing of the Bf 109 to attend to the fighter's cockpit. What appears to be a mobile generator cart can be seen on the ground in front of the composite, and the tip of the warhead has been fitted with a protective cap to prevent erroneous activation of the fuses

COLOUR PLATES

1
Kl 35 D-EXCM and DFS 230B-2 'CB+ZB' of the *Deutsche Forschungsanstalt für Segelflug 'Ernst Udet'*, Ainring, Germany, October 1942

2

Fw 56 'CA+GN' and DFS 230B-2 'CB+ZB' of the *Deutsche Forschungsanstalt für Segelflug 'Ernst Udet'*, Ainring, Germany, October 1942

3
Bf 109E 'A' and DFS 230B-2 D-IEXX of the *Deutsche Forschungsanstalt für Segelflug 'Ernst Udet'*, Ainring, Germany, 1943-44

4
Bf 109F-4 Trop Wk-Nr. 10184/'CI+MX' and Ju 88A-4 'KL+CO' of the *Deutsche Forschungsanstalt für Segelflug 'Ernst Udet'*, Ainring, Germany, 1944

5
***Mistel* S1 (Bf 109F-4 'DE+RB' and Ju 88A-4), Junkers' *Baustelle Nordhausen*, Nordhausen, Germany, early 1944**

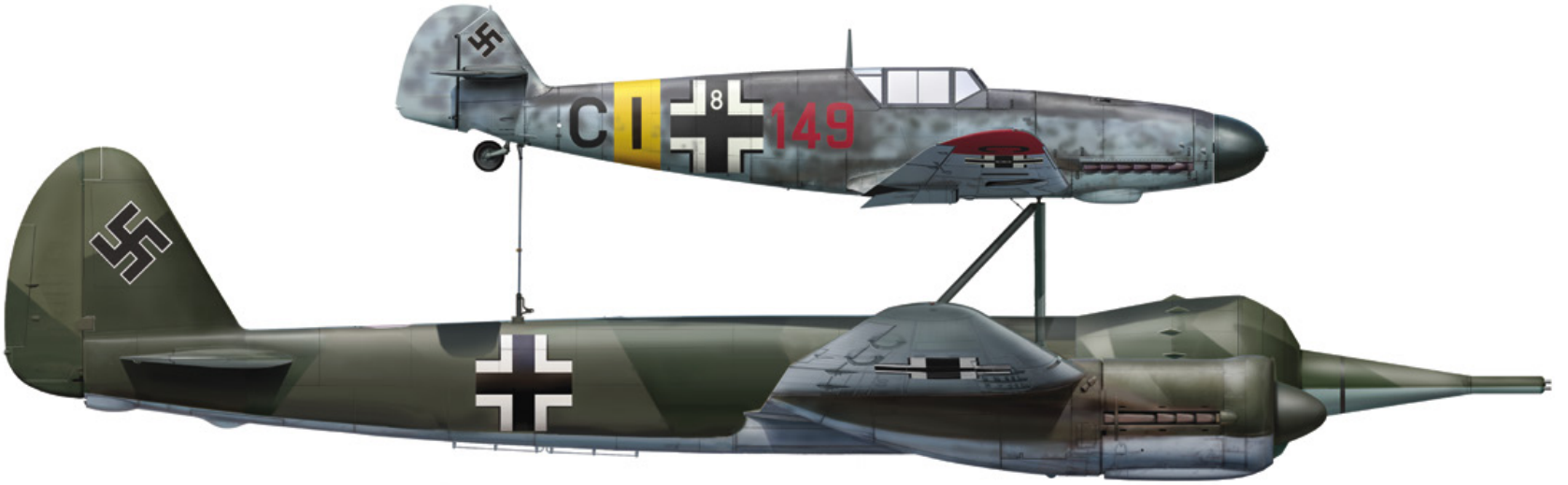
6

***Mistel* S1 (Bf 109F-4 Trop Wk-Nr. 10130/'CD+LX' and Ju 88A-4, Wk-Nr. 10096/'5T+CK') of 2./KG 101, St Dizier, France, June 1944**

7
***Mistel* S1 (Bf 109F Wk-Nr. 5704/'NA+YS' and Ju 88A-4 'CN+FK') of 2./KG 101, St Dizier, France, June 1944**

8 *Mistel* S1 (Bf 109F 'PI+MI' and Ju 88A-4) of 2./KG 101, St Dizier, France, June 1944

9
***Mistel* S1 (Bf 109F-4 Wk-Nr. 13138/'SK+ML' and Ju 88C-6 Wk-Nr. 0430123/'SC+CE') probably of *Einsatzgruppe* 101, Burg, Germany, autumn 1944**

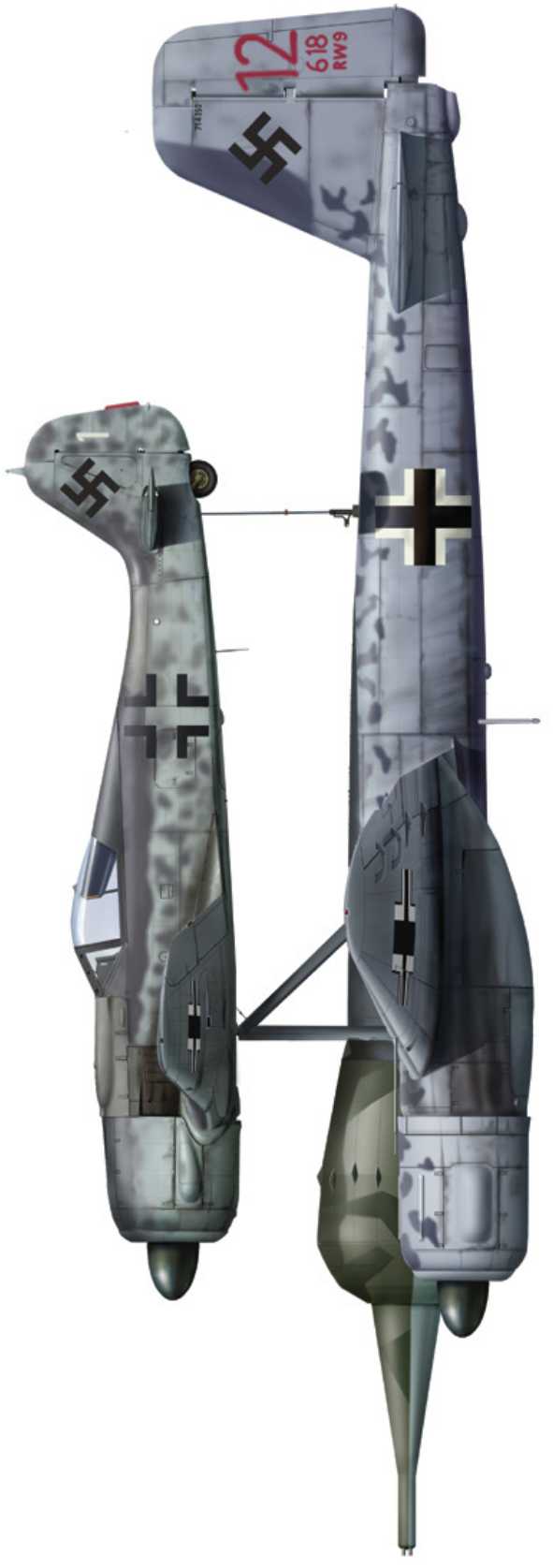


10

***Mistel* S1 (Bf 109F-4 'CI+149' and Ju 88A-4) probably of *Einsatzgruppe* 101, Burg, autumn 1944**

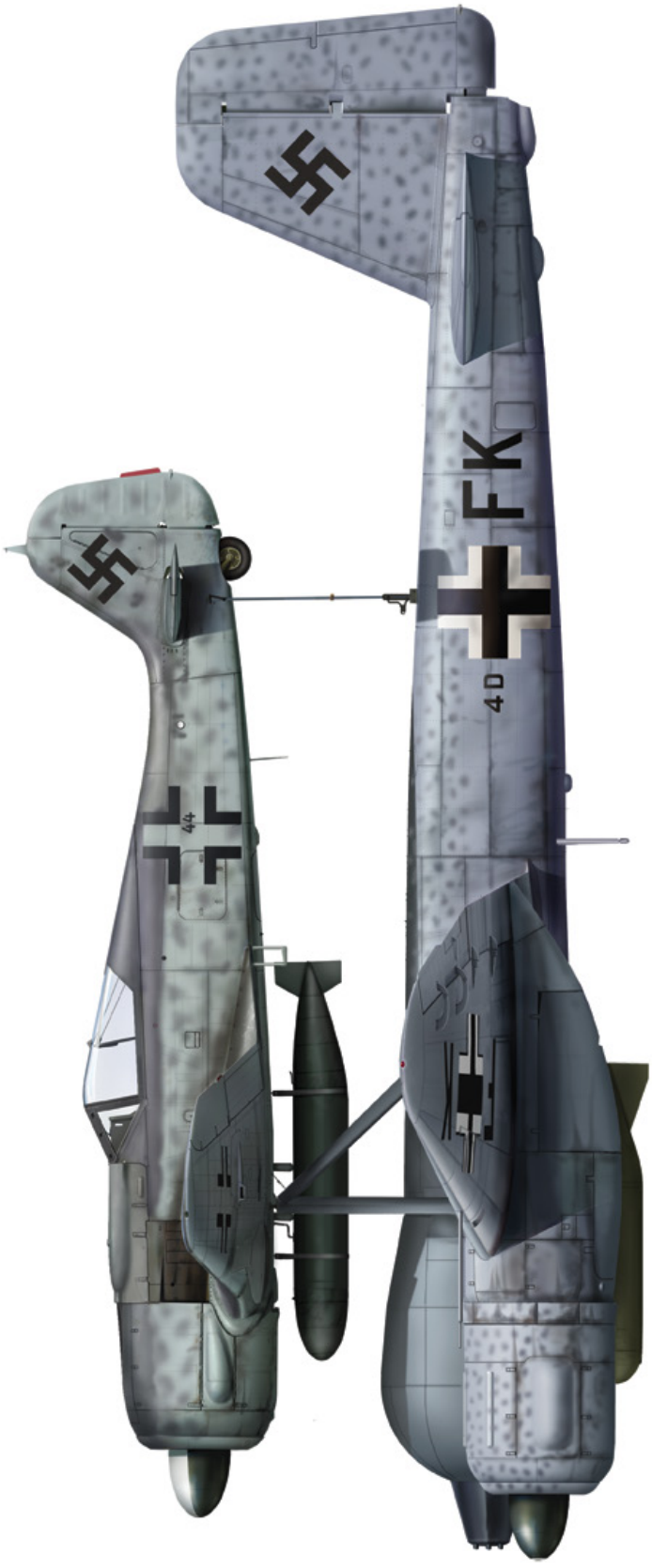
11
***Mistel* S1 (Bf 109F-4 'DE+RB' and Ju 88A 'FI+LL') of II./KG 200, Burg, Germany, late 1944**

12
***Mistel* S2 (Fw 190A-8 and Ju 88G-1 Wk-Nr. 714633) of 6./KG 200, Tirstrup, Denmark, February 1945**



13
***Mistel* S2 (Fw 190A-8 and Ju 88G-1 Wk-Nr. 714050) of 6./KG 200, Tirstrup, Denmark, February 1945**

14
Mistel* S1 (Bf 109F and Ju 88A-4 'VK+QT')** ***Deutsche Forschungsanstalt für Segelflug, **Ainring, Germany, early 1945**



15
***Mistel* S2 (Fw 190A-8 and Ju 88G-1 '4D+FK') of II./KG(J) 30, Oranienburg, Germany, April 1945**

16
***Mistel* S3C (Fw 190A-8 and Ju 88G-10) Junkers Bernburg, Germany, April 1945**

fuselage joint. This is accessible not only from the rear seat but also from the ground after the warhead has been installed. The panel is fitted with engine starter, fuel injection pump, fuel tank transfer valve, fuel gauge, engine temperature and boost pressure gauges, propeller pitch control switch, split flap and undercarriage levers, fuse switch and stand-by compass, so that the Ju 88 can be prepared for flight from that position [i.e. from the flight engineer's position].

'The Me 109 is fitted with two throttles that have explosively separable fork end fittings on the throttle control linkage, an engine revolution selection switch, turbo-supercharger pressure gauge and revolution counter, undercarriage and split flap levers, direction indicators for the three-axis gyro control unit and a switch for arming the warhead. Control inputs are provided by potentiometers. The structure for mounting the Me 109 consists of a forward truss comprising six struts and a simple foldable strut at the rear. The struts are made from steel tubes and have fork end fittings. The struts are faired. The electrical cables are routed inside the fairings. The connections to the fuselage and wing are made with bolts.'

At St Dizier on the night of 10/11 August, the *Einsatzstaffel*/KG 101 carried out another mission against shipping in the Bay of the Seine. No vessels are known to have been hit by the attack, but one of the *Staffel*'s pilots became disorientated and flew close to the south coast of England in error. With fuel running low, he decided to jettison his Ju 88A-4 lower component and attempt to return to France. Once separated, the Ju 88 flew on, crossed the coast and eventually crashed into open farmland near Andover in Hampshire at 2335 hrs with a 'tremendous explosion'. The force of the blast reportedly blew a man over some three miles away. Due to the open nature of the terrain, no damage occurred, although the impact created a large crater and the aircraft itself was 'smashed into small fragments'.

On 18 and 19 August St Dizier was again bombed by the USAAF, and a decision was made to evacuate the field. The *Einsatzstaffel*/KG 101 pulled back to Rhein-Main, where it would continue its training programme and be briefly re-designated as the *Einsatzgruppe*/KG 101, but in reality the '*Gruppe*' never achieved much more than *Staffel* strength. Some training also continued at Kolberg.

As August gave way to September, and the start of a wet, dismal autumn in England, the new month was heralded with a violent opening when, in an echo of what took place near Andover, two more *Mistel* lower components crossed the English coast on the night of 1 September, again wildly off course, coming down at locations some 150 miles apart. The first crashed at Warsop, in Nottinghamshire, at 2330 hrs, the explosion spreading debris over a quarter of a mile. The second blew open a crater 12 ft deep and 40 ft across at Hothfield, in Kent, 15 minutes later. This suggests that they had been intended for shipping targets off the coast of France.

A page from a *Mistel* S2 manual illustrating the *Behelfssitz* (auxiliary seat) slung below the fuselage of the Fw 190 upper component (the same seat was used on the Bf 109 of the *Mistel* S1) to aid movement on the ground when the pilot's forward vision was severely limited. A member of the groundcrew would occupy the seat and operate the brakes of the Ju 88 as and when required, using two hand levers. Once the aircraft was ready for takeoff, the seat would be dismantled and the mechanic would clear the area

A *Mistel* S1 comprising Bf 109F 'SK+ML' and Ju 88C-6 'SC+CE' probably of the *Einsatzgruppe*/KG 101 at an unidentified location on the Western Front, possibly Burg, in the early autumn of 1944. The Bf 109 had been test-flown by Junkers acceptance pilot Heinz Schreiber at Nordhausen on 17 August 1944, after which he flew it attached to the Ju 88 on 23, 26 (twice) and 29 August 1944, with Oberleutnant Dipl.-Ing. Horst-Dieter Lux at the controls of the bomber

Another view of *Mistel* S1 (Bf 109F 'SK+ML' and Ju 88C-6 'SC+CE'), the composite probably being photographed while undergoing acceptance tests by the Luftwaffe in late 1944. The Bf 109 has had a *Reparaturwerkstatt* (works conversion number) '16' applied to its fuselage *Balkenkreuz*

Hauptmann Kurt Capesius was an Austrian who joined the Luftwaffe in May 1938. He underwent initial training at the Luftwaffe academy at Berlin-Gatow, followed by spells at a training school at Celle and an instrument school at Wien. Initially, he flew as a fighter pilot with I./JG 134 and then II./JG 54, also based at Wien, but in April 1940 he transferred to 9./KG 51. Capesius took part in missions flying the Ju 88 over the British Isles, the Balkans and the Soviet Union. Shortly after the invasion of the USSR, however, he was appointed *Staffelkapitän* of 10./KG 51, where he was responsible for training replacement crews. Capesius later returned to 9. *Staffel* and flew many sorties over the Black Sea and Stalingrad. He was awarded the Knight's Cross on 30 November 1944

On the Continent, Field Marshal Bernard Montgomery's 21st Army Group advanced steadily across northwest France and Belgium and was closing on the port of Antwerp. Hitler had recognised the latter's logistical importance, prompting him to tell senior Luftwaffe commanders that 'it must be ensured the Allies cannot use the port for a long time'.

Early in September the *Einsatzgruppe*/KG 101 was placed under the control of a new tactical command, *Gefechtsverband Helbig*, under the leadership of Oberst Joachim Helbig, the former *Kommodore* of LG 1. It was tasked with supporting German ground operations along the Reich's frontier with Belgium and Holland. Of crucial importance was the destruction of potential key Allied crossing points over the Maas, the Waal and the Rhine, as well as the continual harassment of enemy troops, armoured columns and communications centres. Helbig was badly wounded in an air raid in mid-September and his command passed to *Oberstleutnant* Rudolf von Hallensleben, the *Kommodore* of KG 2. The unit was duly renamed *Gefechtsverband Hallensleben*.

What was effectively to be the swansong of *Mistel* operations on the Western Front occurred just under two weeks later when the *Einsatzgruppe*/ KG 101 was ordered by *Gefechtsverband Hallensleben* to make an attack on the bridge over the Waal at Nijmegen, which had been captured by Allied forces. During the evening of 27 September, four *Mistel* S1s took off from Rhein-Main together with eight Ju 88 bombers that had been seconded to the *Einsatzgruppe*. One *Mistel* and two Ju 88s were forced to break off their attack and another *Mistel* went missing. The two remaining composites reported launching their bombers at the bridge, but they missed the target.

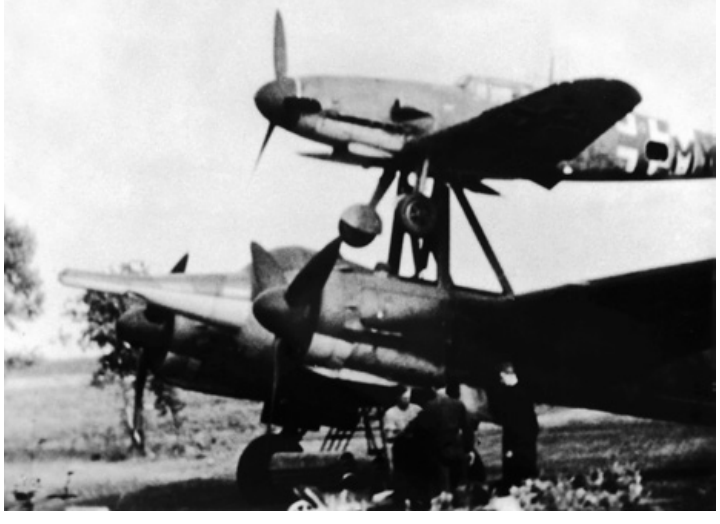
So ended the *Einsatzgruppe*'s brief and disappointing period of operations with the *Mistel*. In late September the bulk of the unit was absorbed into the newly formed III./KG 66 at Burg, near Magdeburg, under Hauptmann Kurt Capesius, a veteran of KG 51 and, like Rudat, presently serving on Peltz's staff at IX. *Fliegerkorps*. This *Gruppe* was formed of a 7. *Staffel* that had been assigned as a pathfinder unit under Oberleutnant Alfred Pilz, an 8. *Staffel* as an operational *Mistel* unit and a 9. *Staffel* based at Kolberg under Rudat as an *Ergänzungsstaffel*. By 2 October 1944 III./KG 66 was reported as 'equipping and organising' with the *Mistel* at Burg, aircrew and ground personnel being drawn from IV./KG 101 and a miscellany of other units. The *Gruppe* reported 15 *Mistel* S1s on strength, of which ten were serviceable.

In atrocious weather during the late afternoon of 3 October, five Bf 109F-4/Ju 88 *Mistel* S1s of III./KG 66 took off from Burg on their first operational mission to attack the Nijmegen bridge at dusk. The aircraft were led by Leutnant Balduin Pauli of 7./KG 66 in a Bf 109, who acted as a pathfinder after departing Burg at 1725 hrs. However, despite the presence of Pauli, events were to prove disastrous for the new unit.

In worsening conditions three of the composites went down in the forested hills of the Teutoburger Wald in the Bielefeld area. Oberleutnant Karl-Horst Polster and Unteroffizier Friedrich Scheffler crashed near Dissen, while Unteroffizier Paul Baranski separated his *Mistel* and then flew into the Hollandskopf (a mountain near Borgholzhausen) in his Bf 109. The Ju 88 flew into a brickworks in Borgholzhausen but did not explode. The two remaining composites were unable to locate the target and their pilots are believed to have been forced to jettison their Ju 88s. One of the pilots, Feldwebel Franz Heckmann, was later recorded as having been lost when he was shot down by Allied fighters in his Bf 109F-4 over southern Holland, although it is not known for certain whether this was prior to jettison or not.

It is not clear how the man seen attending to the canopy of Bf 109F 'SK+ML' of the *Einsatzgruppe*/KG 101 has reached his lofty position!

Three days later, Leutnant Pauli was appointed *Staffelkapitän* of 8./KG 66. On 26 October III./KG 66 was assigned to mount an operation in force against the sluice gates at Kruisschans, on the River Scheldt, eight kilometres northwest of Antwerp. The mission was to use all available *Mistel*, and it was to take place in conditions of bright moonlight. It is not clear, however, whether this mission – or any others – were flown by the *Gruppe*. On 27 October, III./KG 66 reported 18 *Mistel* S1s on strength, with six serviceable, plus 12 crews. The unit also had a further 11 Ju 88s, of which nine were serviceable, with 13 crews. Despite the *Gruppe*'s slowly growing contingent of personnel and equipment, however, it would not be long before it was re-designated. From that point, the *Mistel* would be assigned to some of the most ambitious and audacious operations ever planned by the Luftwaffe.



Mistel S1 Bf 109 'CI+MY' and Ju 88 'CR+CF' is readied for operations, almost certainly at Burg, in the early autumn of 1944. Note the *Reparaturwerkstatt* number just visible within the Bf 109's fuselage *Balkenkreuz*. This *Mistel* was flown by Luftwaffe acceptance pilots Schreiber and Seibert at Nordhausen on 13 and 14 August 1944

CHAPTER FOUR

'DRAGON'S LAIR'

Oberleutnant Herbert Pilz (back to camera), *Staffelkapitän* of 5.(Bel.)/KG 200, discusses target details with a naval liaison officer ahead of a planned mission to Antwerp docks in the winter of 1944. Also seen in this photograph are (far left) Hauptmann Kurt Capesius, *Kommandeur* of II./KG 200, Feldwebel Rudi Riedl of 6./KG 200 (second from left) and Oberleutnant Balduin Pauli, *Staffelkapitän* of 6./KG 200 (fourth from left)

In October 1944 Oberstleutnant Werner Baumbach, the 'ace' bomber pilot and the officer placed in charge of the development and testing of guided weapons for the RLM, was appointed the new *Kommodore* of KG 200. Formed in February 1944, this *Geschwader* – or at least its I. *Gruppe* – was effectively the Luftwaffe's covert and special operations unit. In March of that year II./KG 200 was formed, and amongst its tasks had been the preparation of '*Totaleinsatz*' (operations in which a pilot was prepared to sacrifice himself) and close-range anti-shipping missions using Fw 190s laden with 1000-kg bombs.

With Baumbach's appointment, however, there was a general re-organisation of KG 200, and in early November *Stab* III./KG 66 became *Stab* II./KG 200 (Capesius), 7./KG 66 became 5./KG 200 (a target illumination unit under Pilz), 8./KG 66 became 6./KG 200 (*Mistel* unit under Pauli) and 9./KG 66 became 7./KG 200 (an *Ergänzungsstaffel* or replacement and training unit for 6. *Staffel* under Rudat).

When Feldwebel Rudi Riedl, the former fighter instructor, had completed his training at Kolberg, he was posted to 6./KG 200 at Burg;

'At Burg our *Mistel* were hidden in cutouts at the edge of the forest, and they were given additional concealment by covering them with fir branches. Prior to an operation, the aircraft were pulled out onto the runway by tow-tractors. They were then always parked out in the open in a row ready for takeoff. Because of the heavy weight of a *Mistel* combination, and to

avoid tyre bursts, careful efforts were taken to ensure that the runway was completely clear of any stones or debris prior to takeoff. The warheads were delivered to the airfield by train from the same factory that made *Panzerfaust* anti-tank launchers.'

As II./KG 200 worked up to operational readiness at Burg, at Nordhausen trials were underway with a new combination, this time using an Fw 190 as the upper component mated to a Ju 88A-4 or G model in what would become known as the *Mistel* S2. The advantage of the Fw 190 was that it offered a marginally extended range over the Bf 109F-4, coupled with the powerful BMW 801 engine. Both Oberleutnant Dipl.-Ing. Lux and Feldwebel Schreiber were involved in flight-testing the early examples. Lux recalled;

A shouted conversation on the runway at Burg in early 1945 between the three *Staffelkapitäne* of II./KG 200, believed to have been prior to an aborted attempt to bomb Antwerp docks. They are Hauptmann Fiedler (in leather coat), operations officer of II./KG 200, Hauptmann Horst Rudat (with *Ritterkreuz*), *Staffelkapitän* of 7./KG 200, Oberleutnant Herbert Pilz, *Staffelkapitän* of 5.(Bel.)/KG 200, and, with his hands in his pockets looking away, Oberleutnant Balduin Pauli, *Staffelkapitän* of 6./KG 200. Fiedler, who did not fly, was nicknamed '*Bohnenstange*' ('Beanpole') on account of his height

'In the autumn of 1944 I made the first flight with the new Fw 190/Ju 88G combination. There were bugs – most of them related to the fly-by-wire system and the explosive bolts. During one separation the two forward bolts exploded, but the one at the tail did not. I found myself in an abrupt stall with violent gyrations. My fighter was separated from the bomber, which was flying slightly below me, showing a sizeable hole in the fuselage where normally the rear strut was attached. This told me that my fighter was carrying a 3-metre steel pole from its belly and pointing straight down. I could not land with it. Fortunately, the aircraft was still just about flying normally, and I had enough fuel to do some thinking. My conclusion was to make a high-speed low pass over the field. Being fast would give me enough control and the chances were that the pole would break off or at least bend backwards. It broke off.'

Throughout December Schreiber flew various Fw 190/Ju 88 combinations, effecting several test separations. All went well, and at the end of the month the first *Mistel* 2s were delivered to 6./KG 200. By 10 January the unit was reporting 19 (13) *Mistel* S1s, 13 *Mistel* S2 trainers, one Bf 109 and one Fw 190 on strength. The 7. *Staffel* at Kolberg reported four *Mistel* S1s on strength, of which three were serviceable. The *Stab* II./KG 200 and 5. *Staffel* accounted for 12 Ju 88s, nine Ju 188s and one Fw 190 between them.

At a meeting of the technical section of the OKL in Berlin on 21 December, it was reported that 12 *Mistel* S2 combinations had been completed, with another 20 due by 15 January 1945 and a further 30 by 15 February. However, such was the enthusiasm for the *Mistel* by this stage that the order was extended to 100 units capable of attaining a range of 1500 km to be available by 1 February, and a further 100 capable of 2500 km to be ready by 15 February at the latest. Indeed, by late 1944, significant numbers of Fw 190A and F variants were available, which offered further design possibilities. Dr.-Ing. Haber remembered;

'Plans had been made to use the *Mistel* against targets behind the Russian Front. In order to be able to achieve the required range, it was proposed to

Feldwebel Willi Döhring of 6./KG 200 taps the side of his head in a time-honoured gesture directed at the photographer at Burg in early 1945. Many pilots considered it to be a bad omen to take photographs immediately before a mission. Directly behind Döhring, and partially obscured, is Feldwebel Emil Degering. Both pilots had flown the *Mistel* whilst serving with the *Einsatzstaffel*/KG 101 in France. The *Mistel* S2 seen behind the pilots has its engines running

Three *Mistel* S2 pilots of 6./KG 200 wait for orders to board their aircraft at Burg ahead of an ultimately abortive mission to Antwerp in early 1945. The *Mistel* behind the men has a warhead fitted and the Fw 190 carries a drop tank for extended range. Note also the ladder lying against the right wing of the Junkers with which the pilot would access the fighter. Seen from left to right are Feldwebel Rudi Riedl (without lifejacket), Feldwebel Willi Döhring and Feldwebel Emil Degering

use a combination comprising a He 177 bomber and an Fw 190. This idea was quickly abandoned because of the difficulty in bringing up the He 177s, parked at various airfields across Germany, to a reliable flightworthy condition. Instead, after a few months, orders were issued by OKL to produce 150 *Mistel* aircraft based on the Ju 88G-1 and Fw 190A-8 for this purpose. Incredibly, they were to be built and delivered within six weeks, and the whole of the Junkers concern was mobilised in the attempt to fulfil this order within the stipulated timescale.'

By early 1945, however, with the military situation facing the Third Reich becoming increasingly precarious, there were fewer and fewer targets at which *Mistel* could be launched with any chance of success. In January Reichsmarschall Göring sought desperately for a high-profile mission opportunity with which he could salvage the Luftwaffe's reputation in the eyes of both the Nazi leadership and the German people. The Luftwaffe had failed to push the Allied invasion back into the sea the previous June, it had failed to stop the Allies' round-the-clock bombing, it had failed to offer adequate cover to German ground forces on both the Western and Eastern fronts throughout 1944 and its promises of new units equipped with revolutionary jet aircraft had yet to materialise fully.

Göring thus ordered Baumbach to make preparations for one of the most audacious operations ever to be considered by the Luftwaffe. The Reichsmarschall hankered back to a target that he had dreamed of attacking in strength at the outbreak of war. At the time his plan had been rejected by Hitler, who feared retaliatory attacks on the *Reich* as a consequence. Now, with the *Mistel*, Göring had the opportunity to launch an attack on the Royal Navy anchorage at Scapa Flow. The codename *Drachenhöhle* ('Dragon's Lair') was conjured up for the proposed operation.

Throughout the latter half of 1944, the big ships of the Royal Navy's Home Fleet regularly passed in and out of Scapa Flow. During June and July, the Fleet aircraft carriers *Victorious*, *Indomitable*, *Implacable*, *Indefatigable*, *Formidable* and *Furious* all passed through there, as did the battleships *Duke of York* and *Howe*.

By 10 January 1945 Baumbach had marshalled the required forces from KG 200 for the attack – 15 *Mistel* from 6./KG 200 would form the core strike force, supported by

12 Ju 88 and Ju 188 illuminator aircraft from 5./KG 200. On 12 January these aircraft were ready for transfer to Tirstrup, in Denmark, from where it was envisaged they could fly the operation at any time from the 20th. On schedule, 12 *Mistel* S2 trainers of 6./KG 200 transferred from Burg to Tirstrup on the morning of 12 January.

Mistel S2 'Red 11' (comprising an Fw 190A or F mated with Ju 88G-1 Wk-Nr. 714533) of 6./KG 200 was photographed close to its woodland dispersal on the edge of Tirstrup airfield, in Denmark, in the spring of 1945. This was one of the *Mistel* slated to take part in Operation *Drachenhöhle*. The tactical number '11' has been applied to the lower tailplane immediately below the *Hakenkreuz*

The day before, Feldwebel Riedl had been ordered to 7./KG 200's base at Kolberg to assist with training, as he recalled;

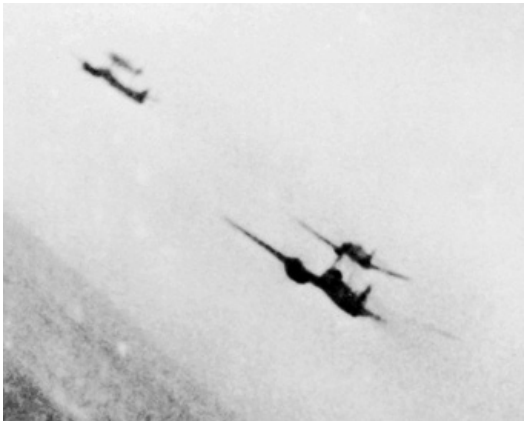
'I had just arrived at Kolberg by train when I received a teleprint message ordering me to return as quickly as possible to Burg, where I was to collect my aircraft. When I got back to Burg, I was told to fly immediately to Tirstrup for a special operation. The other pilots had already departed. I just had time to pack my belongings into a suitcase and place them in the safety of the cellar under our barracks.

'The flight to Tirstrup from Burg took us directly north over Kiel, towards the Danish island of Langeland. As we flew in low over Kiel harbour, we passed some U-boats lying on the surface. Their crews did not recognise the lone *Mistel* as a friendly aircraft and considered us to be hostile, at which point they began tracking us with their deck-mounted guns. We tried to indicate that we were friendly by waggling our wings, but this seemed to have no effect and, rather worryingly, the guns still followed us. I eventually fired a recognition flare from the cockpit, which thankfully seemed to convince them that we were not a "hostile", but nevertheless it was a hairy moment. Thankfully, we reached Tirstrup in one piece.'

When 6./KG 200's aircraft arrived at Tirstrup they were rolled into earth revetments and camouflaged. Aircrew and staff were quartered in a large farmhouse five kilometres southwest of the airfield. That same day (12 January) the warheads arrived by train from Germany and were fitted immediately to the Ju 88 lower components of the composites.

Tactically, the plan for *Drachenhöhle* was for the *Mistel* to fly directly from Denmark, across the North Sea, to Scapa Flow. 'We received only one proper briefing', Riedl explained, 'which took place in a large room in a house near the airfield – there was a large map of the Scapa Flow area in the room. Each pilot was assigned a specific target, since we received regular reconnaissance updates on British shipping movements. I knew exactly where my target ship was anchored. To help us further, at Tirstrup, we had a large, specially built model of the harbour on which were laid scale models of all the ships known to be there. The real prize was to be assigned an aircraft carrier. It was felt amongst the pilots that if the *Mistel* had been introduced earlier, and in greater numbers, its effect against certain pinpoint targets, such as ships, could have been far more decisive. Any ship – no matter what size – if hit by a *Mistel* would have gone under.

'There were to be 12 aircraft – no reserves – and the idea was to fly to the target in cloud so as to minimise the risk of being spotted by British



Two *Mistel* of II./KG 200 caught by the gun camera installed in the P-51 flown by Lt Bernard H Howes of the 55th FG. The Mustang pilots had spotted the *Mistel* after they pulled up following a strafing attack on a locomotive near Hagenow on 3 February 1945. The *Mistel* were part of a formation of four flying from Burg to Tirstrup to take part in Operation *Drachenhöhle*. Following the P-51 attack Howes witnessed one *Mistel* crash into a village, where it blew up houses

air patrols or anti-aircraft guns. Fuel for the outward flight would be drawn from the Ju 88 lower components, and the amounts required had been calculated down to the last drop. Marker buoys had been laid out to guide us in. We were to adopt a line astern formation. We all wanted the mission to work because we knew we would be decorated when we got back – there was even talk of the Knight's Cross if we made it.'

The *Mistel* were to approach to within five kilometres of their targets at minimum height to avoid radar detection, and then climb to 800 metres for target identification. Targets would be selected and the attack would commence as final adjustments were made to autopilots on the lower components. The pilots would effect separation and launch 1600 metres from their targets while in a glide of 20 degrees. 'Once the attack had been made, the plan was for our Fw 190s to climb as fast as possible to 7000 metres and make for Stavanger, in Norway, which was the closest point for a safe landing', Riedl recalled. 'Both our forces in Norway and the Kriegsmarine had been warned to expect us, and the Kriegsmarine had been briefed to watch out for any pilot unable to make it as far as Stavanger, and who might have to bail out due to lack of fuel'.

The waiting played on the nerves of the handful of pilots. In their minds, they went over the mission and studied the model again and again. They eased tension by playing cards and ice hockey, using a beer can as a puck.

At the beginning of February, four *Mistel* S1s from 7./KG 200 at Kolberg were assigned to bolster the strength of the attack force in Denmark. These composites left Kolberg on the afternoon of 3 February and were flown by crews comprising members of 6./KG 200 and KG 30, whose personnel had recently undergone fighter training in preparation for operations with either the Me 262 or the *Mistel*. Feldwebel Fritz Lorbach of 6./KG 200 was assigned to fly a Ju 88 to Tirstrup that day, and he recalled;

Feldwebel Fritz Lorbach of 6./KG 200 encountered P-51s of the 55th FG on 3 February 1945 and survived. He would later fly the *Mistel* against bridge targets on the River Oder in the spring of 1945

'The whole unit stationed in Kolberg comprised four *Mistel* with Me 109s, and their attending personnel. A stopover in Hagenow had been planned. Our *Staffelführer*, Oberleutnant Schiffer, and his crew took off first because of low cloud and made a good landing at Hagenow. The rest – three *Huckepacks* ('piggybacks') with their pilots, Willi Kollhoff, Franz Pietschmann and I – flew in loose line astern formation from airfield to airfield, listening out for warnings of approaching enemy aircraft because our fighters were not armed. A group of fighters flew across our path before we reached Hagenow. I thought they were Me 109s. My mistake. They were Mustangs, as I discovered when they began to fire at us as we flew in closer formation over the airfield and I spotted the American markings.'

The P-51s, from the 55th FG, were returning home, having escorted more than 900 B-17s on a raid to Berlin. Lt Col Elwyn C Righetti, the group's Executive Officer (who would become the USAAF's top strafing ace with 27 aircraft destroyed and several locomotives to his credit), had just detached the 338th FS from the rest of the group so as to make a low-altitude ground sweep along the course of the homeward-bound bombers. Breaking into two flights, the Mustangs then hunted for

targets of opportunity. Righetti, leading White Flight, reported;

'Near Boizenburg, on the Elbe River, I located a small hole in the unbroken overcast. Through the hole I could see two locomotives, which I called in before heading down after them. Visibility was about two miles, and scattered fuzz on the overcast ran down in some places to 500-600 ft. I rolled out of my turn and started my final approach to the locos about four miles off. I had already assigned the locos and parts of the train to the flight. We were echeloned to the right, with my position on the extreme left.

Ace Lt Col Elwyn C Righetti of the 55th FG claimed a *Mistel* destroyed near Hagenow on 3 February 1945. He wrote, 'before I could open fire, I discovered that the Buzz Bomb was actually a Focke-Wulf 190 fastened atop the heavy twin-engined aircraft. As I was closing to fire, the heavy aircraft seemed to be jettisoned, went into a shallow diving turn to the left and crashed and burned in a small hamlet'

'At a distance of two miles from the train I spotted three piggyback aircraft at 10.30 to me, at our same altitude of about 600 ft, headed almost directly at us and half a mile off. I mistakenly identified them as Buzz Bomb-equipped He 111s and broke off rapidly, left and up, in a 200-degree chandelle, positioning myself on the tail of the middle one. I started firing two short bursts at 600 yards and missed. I swung into trail and closed to point blank range, firing a long burst. I saw many excellent strikes on the fuselage and empennage of the large aircraft and scattered strikes and a small fire on the fighter. Both aircraft, still fastened together, went into a steep dive straight ahead. I was about to overrun them and did not see them crash, but a few seconds later I saw a large explosion and spotted considerable burning wreckage.

'I still did not know what we were attacking, so I turned slightly to port for another look. As I closed, and before I could open fire, I discovered that the Buzz Bomb was actually a Focke-Wulf 190 fastened atop the heavy twin-engined aircraft. As I was closing to fire, the heavy aircraft seemed to be jettisoned, went into a shallow diving turn to the left and crashed and burned in a small hamlet. Apparently it carried no bombs, for the gasoline thrown from its tanks burned for some time, and I did not observe any unusually large explosion.

Having separated from its upper component, this Ju 88 veers low over the countryside near Hagenow as it attempts to evade pursuit by a Mustang during the encounter between II./KG 200 and the 55th FG on 3 February 1945. The support struts are clearly visible

'The Fw 190, relieved of its load, snapped to the right and then began a wild evasive action. I drove up to 200 yards directly in trail, firing intermittently, and secured excellent strikes along the fuselage, wing roots and canopy, inducing good fire. Jerry went out of control and crashed straight ahead. At this time I noticed a few tracers too close and coming from behind. I broke sharply left and up into a low cloud. I don't know who or what was firing at me, but it might have been the third Fw 190, having jettisoned its bomber.'

Also flying with White Flight was 23-year-old Lt Bernard H Howes, who recalled;

'While pulling up from a first attack on a locomotive, I sighted a formation of three "pick-a-backs" flying in line at about 4000 ft altitude. I turned into the second "combo", with my wingman, 2Lt Patrick L Moore, following behind me. I fired a short burst from about 350 yards and at an angle of 90 degrees, observing strikes on the Fw 190. As I fired, the Fw 190 atop the third unit was released.

This still from the gun camera film taken by Lt Bernard H Howes on 3 February 1945 clearly shows a crewman bailing out from the Ju 88

The propellers were all windmilling and the Fw 190 seemed to nose up, then dropped nose down – it was apparently out of control and headed for the ground. The Ju 88 turned sharply left. I followed, firing short bursts. I fell outside the turn and momentarily lost sight of the Ju 88. 2Lt Moore, following me, was in position and shot down the Ju 88. When I looked back, I saw it crash into the ground.

'After pulling up, I saw the first unit I had fired on at about 300 yards in front of me. There were flames coming out of the Fw 190, so I went after it again. I started firing and the "combo" turned into me and then dropped to treetop level. On a second pass I set the right engine of the Ju 88 afire, and saw both aircraft crash into the ground.'

Howes also reported seeing at least one *Mistel* crash into a village, where it 'blew up, destroying a mass of houses'. Another Mustang pilot, Lt Richard Gibbs, reported;

'I took the third and last one of the gaggle. I started firing on the Junkers at about 45 degrees from about 800 yards, closing to about 300 yards, with a two-second burst. I observed many strikes on the left wing root of the bomber, where it began to burn. After a short dive the fighter was released. It appeared rather unstable in the air, but managed to conduct violent evasive action. I fired a short burst from astern, beginning at about 200 yards and closing to zero yards. I saw strikes all over the aircraft and observed parts of the cowling and canopy fly off. There was also a fire in or around the cockpit. I overran the Fw 190 and skidded to the right, and looking back I saw where it crashed into the ground.'

Feldwebel Lorbach recalled what happened when the Mustangs fell upon the German formation;

'Our altitude was 150 metres, and that of the clouds 300 metres. The *Mistel* flown by Kollhoff and myself separated, the Me 109s heading for the clouds, but they were shot down. Pietschmann's *Mistel* dived into the ground. Kollhoff made an emergency landing on the bank of the River Sude but was strafed on the ground – a member of his crew was killed, and he was wounded in the elbow. The crew of my Ju 88 was not injured even though the left engine was on fire and I had had to make an emergency landing in the woods.'

Oberfähnrich Franz Pietschmann of 6./KG 200 was killed near Hagenow on 3 February 1945 when his *Mistel* dived into the ground following an attack by Mustangs of the 55th FG

Oberfähnrich Franz Pietschmann was killed, as was his gunner, Oberfeldwebel Ernst Rübsam, and his flight engineer, Obergefreiter Paul Giemsa. According to Lorbach, Feldwebel Willi Kollhoff suffered wounds when his Ju 88A-4 made an emergency landing and his gunner, Feldwebel Franz Fischl, was killed. The aircraft was categorised by KG 200 as 80 per cent destroyed.

Although the American pilots reported the upper components as 'Fw 190s', this conflicts with official German losses, which, with one exception, lists the fighters as Bf 109s. However, one Fw 190A-8 flown by Oberleutnant Otto Burkhard of KG 30 is listed as being lost by 6./KG 200 over Hagenow during the action, and this was probably the aircraft caught on Lt Gibbs' gun camera film. The other aircraft reported as lost that day were two Bf 109F-4s, with both of their pilots, Obergefreiter Joachim Uhlig and Oberfeldwebel Arnold Klähn, attached to 6./KG 200 from KG 30, being killed. The effect of this action upon German plans can only be speculated, but on 12 February 1945 an entry in the OKL War Diary

records, 'Following discussions with the *Kommodore* of KG 200, the *Reichsmarschall* postponed the final decision to carry out Operation *Drachenhöhle* for three days.'

Pilots of the RAF's Fighter Experimental Flight line up in front of the Mosquito VI of nightfighter ace Wg Cdr John Cunningham on a winter's day at Ford, in Sussex, in early 1945. Seen together with the flight's commander, Sqn Ldr Bob Kipp (fifth from left), are three of the four aircrew who took part in the raid against the *Mistel* of II./KG 200 at Tirstrup airfield on 14 February 1945, namely Flt Lt Tony Craft (first left), Flg Off Roy LeLong (sixth from left) and Flg Off 'Mac' McLaren (third from right). Wg Cdr John Cunningham was visiting the unit at the time

Meanwhile, the day before the encounter between the 55th FG and the *Mistel* of II./KG 200, the RAF's specialist Fighter Interception Development Squadron (FIDS), based at Ford, in Sussex, was briefed to 'patrol to Tirstrup' – an airfield that had previously warranted little attention. FIDS despatched two of its Mosquito VIs for the task, but they ran into thick cloud down to sea level off the Danish coast and contact was lost with one machine approximately 25 miles northwest of Sylt – it subsequently failed to return. Another attempt to reach Tirstrup was made during the afternoon of 9 February by a pair of Mosquito VIs from the Fighter Experimental Flight (FEF), also based at Ford. However, the mission was abandoned when, once again, cloud brought visibility down to zero feet just three minutes flying time from the Danish coast.

Formed in late October 1944, the FEF was tasked with conducting deep penetration daylight 'Intruder' (or 'Day Ranger') missions under cloud cover along the Baltic coast or over southern Germany. Flg Off John Waters had joined the FEF as a navigator in late 1944, and he recalled;

'All members of the FEF were experienced and had completed at least one tour of operations – all except me. I was the only "sprog". The full strength was six crews, which we hardly ever were.'

On 14 February a third mission was planned for Tirstrup. New Zealander Flg Off Roy LeLong, with Flg Off J A 'Mac' McLaren as navigator, and Flt Lt Tony Craft, with John Waters as navigator, were picked for the job, and at 0840 hrs their two Mosquito VIs were airborne from Ford. The Mosquitoes flew towards Manston, then set course over the North Sea at 'zero feet', this time in clear weather with good visibility. Landfall was made at Stadil, north of Ringkobing, on the east coast of Jutland, followed by another leg across Jutland and then south to Tuno, where the course was altered for the target. The time was 1056 hrs. Waters remembered;

'"Mac's" job was chief navigator and mine was second navigator, just to keep a check, but mainly to make sure we were not "jumped". We had 50-gallon drop tanks, the fuel from which was siphoned into the wing tanks just before reaching the Danish coast. The pilot then pressed the "tit" and the tanks dropped off. But there was no such luck for us on this occasion – press as much as Tony Craft could, they refused to drop off and remained firmly secured to the wings throughout the trip! R/T silence was the order of the day until one reached the target. But on reaching Mariager

Flg Off John Waters of the Fighter Experimental Flight was a navigator in one of the Mosquitoes that attacked Tirstrup on 14 February 1945. 'I can still see those "pick-a-back" aircraft – and our frustration when the bloody guns got stuck (we hardly used any ammunition)', he subsequently recalled. 'I can also still see the groundcrews scattering, such was our surprise visit!'

[in central Denmark], Roy LeLong phoned up beseeching my pilot that it would be better "for God's sake to *drop* the bloody drop tanks!" It was a fascinating but short conversation.

'It was a hard winter – ice and snow and floods all added to the excitement of map-reading – and "Mac" did a good job in finding the airfield so quickly. At least we found it before they found us, and that was very important!'

Shortly before 1110 hrs, the two Mosquitoes closed in on Tirstrup and commenced their first attack run. Waters recalled;

'On what I assumed was a well-defended airfield such as this, we didn't want to hang around – this attack would have lasted no longer than one to two minutes. The whole essence was surprise – hence the low level – and as soon as the Hun gunners got going, we would have cleared off very smartly. I suppose it was like large-calibre clay pigeon shooting as far as they were concerned, and they were pretty good at it too. Once the flak started the strict rule was to beat it.

'There was, very much from the pilot's point of view, an art in strafing – if you came in too low, then you flew through the stuff that your cannon threw up. The four 20 mm cannon were not parallel to the fore and aft axis of the aircraft – the muzzles were inclined downwards, hence one needed a bit of height for strafing. But if you were too high, the navigator got the twitch because he could see where the flak was coming from. Since we were following "Mac's" map-reading, I was "riding shotgun", and my first view was of an Fw 190 perched on top of a Ju 88.'

Down on the ground, the *Mistel* pilots of 6./KG 200 had left their quarters at Mollerup and were en route to Tirstrup. They had been advised that as a result of improved weather conditions, there was a fair chance that the Scapa Flow mission might be attempted that day. However, as they neared the airfield, they heard the anti-aircraft guns firing. Rudi Riedl recalled;

'We had all climbed aboard the Opel Blitz truck as usual for the short journey to Tirstrup. I was wearing all my flying gear ready for flight, including a life vest. We didn't make it as far as the airfield before the RAF arrived. I gazed upwards and saw two twin-engined fighters approach over the tree tops in the distance, then there was one hell of a commotion.'

LeLong described his attack in his combat report;

'I approached the aerodrome from the east, the aerodrome being hard to find owing to snow and ice. On approach, I flew parallel to the east-west runway on the south side. At first I could not see any aircraft, but finally saw about five-six Fw 190 and Ju 88 pick-a-backs with normal camouflage well-dispersed in fir trees. My sight was u/s, so I used the plate glass for sighting, letting strikes hit the ground in front of one of these pick-a-backs. I pulled the nose up a little and saw many strikes on both the Fw 190 and the Ju 88. Numerous personnel working around these enemy aircraft were scattered by the attack.

'I turned south into the next dispersal bay and made a similar type of attack on another pick-a-back, also seeing strikes. I then turned west and attacked for a second time the first pick-a-back that I had previously damaged. This time both the Ju 88 and Fw 190 burst into flames. After breaking away from this last attack, light flak opened up at me, so we headed for our rendezvous at Mariager. Two columns of black smoke were seen long after the aerodrome was left.'

Mistel S2 'Red '12' of 6./KG 200's Feldwebel Rudi Riedl at Tirstrup in early 1945, fitted with a warhead that suggests imminent use. The composite was formed from an Fw 190A-8 and Ju 88G-1 Wk-Nr.714050, which also bore 'RW9' in red visible on its rudder – this was the *Reparaturwerkstatt* or works conversion number applied by Junkers at Nordhausen. The Fw 190 had a muted white tactical number '1' on its rudder

Moments later, the second Mosquito made its first run. Waters recalled, 'We were following, hugging the deck, young Waters busily looking all around to make sure we were not being jumped. But we were just too low on our first run and missed out'. Craft wrote after the mission;

'I approached Tirstrup from the east at zero feet. Flew down the east-west runway and saw a Ju 88 painted black to starboard in a wood to the north of the runway. Before turning starboard in an orbit to attack, I saw the Fw 190 and Ju 88 pick-a-back aircraft in flames subsequent to Flg Off LeLong's attack. I then attacked the Ju 88 from east-to-west and left it in flames [1110 hrs]. Just after this attack three light guns opened up at us from west of aerodrome.'

'Tony Craft obviously had a fixation with this black Ju 88, and we were too low to have a go at the "pick-a-back" straight ahead', Waters explained. 'I think Roy LeLong did three runs and we did two. The Ju 88 would have been nailed on our second run. I can still see those "pick-a-back" aircraft – and remember our frustration when the bloody guns got stuck (we hardly used any ammunition). I can also still see the groundcrews scattering, such was our surprise visit! When the light flak opened up I suppose I got scared and too excited, as I gave my pilot the ground speed to steer instead of the compass course – true inefficiency in the style of "Pilot Officer Prune". The result was the two aircraft left the airfield in opposite directions – which I insist foxed those Hun gunners! But once that flak started Roy LeLong phoned us up and we quit immediately.'

LeLong told a newspaper reporter afterwards, 'When we left, the composite and another aeroplane were blazing furiously. We riddled another composite nearby'.

'We rejoined at the lake at Mariager and returned to base', Waters continued. 'I have a vivid memory of two men who stopped hoeing in a field – and waved to us – just before we crossed the coast. On arriving home we taxied to dispersal, stopped the engines, undid our straps, took off our helmets and, as I slid out backwards through the door, my pilot let go of the stick, which just flopped to one side and lo, there were two *thuds* as our two *bloody* wing tanks dropped to the ground! I quickly darted off

to our dispersal hut in time to hear two sergeant ground staff receiving what can only be described as a "right good bollocking" and a lot of nasty threats!'

Although surviving German documents seem, ostensibly, to attribute the sudden cancellation of the Scapa Flow attack to the juggling of fuel priorities (another operation using *Mistel* was being planned in the East), the recollections of those who took part in the events of 14 February indicate an alternative and more intriguing scenario. In a revealing post-war testimony, Balduin Pauli, the former *Staffelkapitän* of 6./KG 200, wrote in a letter to former comrades;

'After the war, when I met Baumbach in Spain, he said the *Reichsmarschall* desperately needed a success as a matter of prestige – "his" Luftwaffe having been discredited – so that he could once again show his face to the *Führer*. However, in Baumbach's opinion, the [Scapa Flow] mission was not essential to the war effort and, in all probability, we stood to incur a casualty rate of about 80 per cent. So, using certain channels, he had deliberately betrayed the operation.'

Precisely what these 'certain channels' were remains unknown, but the pattern of events in England in February is also interesting. On 13 February, the FEF's Canadian CO, Sqn Ldr Bob 'Kipper' Kipp, who had previously flown with No 418 Sqn, RCAF, received a telephone call from Wg Cdr S N L Maude, who worked at HQ Fighter Command at Stanmore. John Waters remembered that leading up to the mission there were 'scrambled' telephone conversations between Maude and Kipp;

'I have a suspicion that Maude had received information from some intelligence source, and then we received our instructions to go to Tirstrup. I'm pretty sure that we aircrew had no idea that we should find those composite aircraft there – I doubt if Bob Kipp did either, but he might have had some knowledge as a result of those telephone calls.'

Surviving documents show that British Intelligence was made aware of *Mistel* at Tirstrup as early as the end of January. In a report to the Chief of Air Staff from the Assistant Chief of Air Staff (Intelligence) dated 28 February, it is stated, 'An agent has reported at the end of January and on 19 February that a large quantity of *Mistel* aircraft have arrived on two airfields in Denmark.'

While the betrayal of the operation cannot be confirmed – or denied – with absolute certainty, there is no doubt that the operation was, once again, postponed. On 16 February the war diary of the OKL records that, 'The *Reichsmarschall* has decided that Operation *Drachenhöhle* cannot be carried out for the time being'. Thus the Royal Navy escaped *Drachenhöhle*. However, at least one of 6./KG 200's pilots was not so lucky. 'Once it was decided to cancel the operation', Rudi Riedl recalled, 'we were sent back to Burg. Upon our return, we found that the airfield had been bombed and my suitcase, into which I had earlier placed all my belongings, had been stolen in the aftermath.

CHAPTER FIVE

'IRON HAMMER'

A civilian technician walks past a line-up of four *Mistel* S1s of II./KG 200 at Burg in early 1945. KG 200 was assigned overall responsibility for the tactical execution of Operation *Eisenhammer*, although the *Geschwader* was able to field only 15 trained *Mistel* crews

Even as the pilots of 6./KG 200 waited at Tirstrup, at the headquarters of the OKL the Luftwaffe Chief of General Staff, *General der Flieger* Karl Koller, authorised the activation of another large-scale operation involving *Mistel* composite bombers – this time in the East.

The notion of attacking the key power stations of the Soviet Union had lingered in the corridors of the OKL since 1943. Indeed, a Ministerial official in the RLM, Professor Dr.-Ing. Heinrich Steinmann, head of the *Bauabteilung* V 10 (Construction Section 10) of the RLM's *Luftwaffenverwaltungsamt* (administration department), had been commissioned to produce a feasibility study on the prospects of the Luftwaffe mounting a significant bombing attack against the power supply infrastructure of the Moscow and Upper Volga regions. The Moscow area alone accounted for 75 per cent of the output of the armament industry, so an effective attack could have had a considerable impact. Steinmann believed that by carrying out such a strike, the Soviet Union's ability to wage war would be severely impinged.

However, when Steinmann submitted his report it was met with scepticism by Luftwaffe intelligence officers who felt that the proposed target list was too lengthy, and that attacks on key industrial targets would produce more significant results. Undaunted, Steinmann set about producing a further report, this time centred around a strike against a range of Soviet hydro-electric and steam power plants.

In early 1945, the technical and engineering specialist Professor Dr.-Ing. Heinrich Steinmann was head of the innocuously titled *Bauabteilung* V 10 of the RLM's *Luftwaffenverwaltungsamt* (administration department). In this capacity he was the mastermind behind Operation *Eisenhammer*, the plan to launch a mass air strike against the Soviet hydro-electric power infrastructure

Steinmann's ideas received some support from *Reichsminister* Albert Speer, the armaments minister, who took the idea to Hitler. As Speer recorded in his memoirs;

'We had wooden models of the power plants made for use in training the pilots. Early in December I had informed Hitler. On 4 February [1944] I wrote to Korten [the previous Chief of Staff], the new Chief of Staff of the air force, that "even today the prospects are good for an operative air campaign against the Soviet Union. I definitely hope that significant effects on the fighting power of the Soviet Union will result from it". I was referring specifically to the attacks on the power plants in the vicinity of Moscow and the Upper Volga. Success depended – as always in such operations – upon chance factors. I did not think that our action would decisively affect the war. But I hoped, as I wrote to Korten, that we would wreak enough damage on Soviet production so that it would take several months for American supplies to balance out their losses.'

Nearly a year was to pass until, on 6 November 1944, Göring ordered that in the next full moon period a specially created force of ten He 177 bombers formerly of II./KG 100 was to carry out an attack on three Soviet hydro-electric plants. The bombers, which would deploy BM 1000 *Sommerballon* ('Summer Balloon') floating bombs, were to be placed under the operational control of KG 200, which in turn would act 'in closest cooperation' with Professor Steinmann. However, Steinmann was dealt another blow when KG 200's operations officers calculated that a further 150 cubic metres of fuel would be needed for the operation than he had forecast. Furthermore, the He 177's Daimler-Benz DB 610 engines had proven unreliable in frontline service, and replacement parts were now in short supply. As a result of these difficulties the plan was eventually dropped. Thus, attention turned to the possibility of using *Mistel* to carry out a raid.

Under the codename '*Eisenhammer*' (Iron Hammer), Koller and Steinmann once more proposed a dawn attack against electrical power production in the Moscow/Upper Volga regions to be carried out in the forthcoming moonlit period (February-March), specifically at the hydro-electric plants at Rybinsk and Uglich and the steam-power plants at Stalingorsk, Kashira, Shatura, Komsomolsk, Yaroslav, Aleksin, Tula, Balakhna, Gorki and Dzerzhinski. German intelligence believed that 90 per cent of the Soviet Union's motor vehicle production emanated from the Moscow/Upper Volga areas, along with 50 per cent of its ball bearing output and 60 per cent of its light assault gun manufacture.

This time it was proposed to use all available *Mistel* S2 composites to carry out the attack. As Horst-Dieter Lux noted, 'This mission required a platform that would deliver a large explosive device with extreme accuracy – "Piggyback" was the only system which could do that'.

As before, Koller assigned operational control of the mission to KG 200, although the *Geschwader* was to carry out its task in close collaboration with the *General der Kampfflieger* and Professor Steinmann. To prepare for the mission, OKL further envisaged production of 100 *Mistel* S2s by February 1945, and should KG 200 require additional crews for them, the *General der Kampfflieger* was supposed to supply these. Just how realistic this expectation was by this stage of the war was a matter for conjecture. Koller and OKL also stipulated that if, as predicted, the winter ice around

the targets thawed by the time the mission was carried out, BM 1000 floating bombs would also be deployed.

On 10 January OKL demanded that in addition to the 100 composites required by the end of the month, a further 50 *Mistel* be ready by 15 February. However, Baumbach warned that II./KG 200 could only provide 15 trained crews, and that these would be needed just to transfer completed composites from the Junkers assembly plants. A possible solution was to take on crews from KGs 30 and 40 who could be converted to the *Mistel* relatively quickly.

The original intention had been to place pilots from both these units under the control of Peltz's IX.(J) *Fliegerkorps*, which had been detailed to retrain redundant bomber pilots as fighter pilots for the defence of the Reich. But KG 40's personnel had, at best, only limited experience on the Ju 88 and none on the Bf 109 or Fw 190. Conversely, the previously Ju 88-equipped KG 30 had been undergoing fighter conversion since the autumn of 1944, and was thus more suited to provide pilots experienced on both the Junkers bomber and single-engined fighters. This made them ideal candidates for *Mistel* conversion.

On 30 September 1944 I. and II./KG 30 had commenced their transition to fighters at Prague-Ruzyne, Prague-Gbell, Königgratz and Chrudim (III. and IV. *Gruppen* had been disbanded). Although most of the former bomber pilots found the transition to single-engined fighter aircraft relatively straightforward, the unit suffered the loss of its *Kommodore*, Oberstleutnant Siegmund-Ulrich Freiherr von Gravenreuth, on the 16th when his Bf 109 crashed into the ground following a high-altitude flight. The *Kommodore* of KG 100, Oberstleutnant Bernhard Jope, who had been awarded the *Ritterkreuz* in 1940 for sinking the *Empress of Britain* whilst flying Fw 200s with KG 40, then took command of newly re-designated KG(J) 30.

For Operation *Eisenhammer*, Koller proposed that the *Mistel* – those of II./KG 200 as well as I. and II./KG(J) 30 – be placed under Jope's central command at Prague-Ruzyne. Some time during January 1945, Jope was summoned to a meeting in Berlin with OKL and Steinmann. As he recalled;

'The main part of the briefing was given by a civilian professor from the intelligence department. We learned that many of the combinations earmarked for the operation were ready, and work on putting together the remainder was proceeding at the highest priority. The first of these aircraft would be delivered to Ruzyne shortly, and training for the operation was to begin immediately. We left the two-hour briefing breathless with excitement. The enemy had been having his way for too long. Now, at last, we could see a chance for us to strike back hard.'

In Berlin, however, it seems that competing interests were at work, for according to a minute from the OKL daily conference on 2 February, 'The Reichsmarschall agreed that the 100 *Mistel* aircraft planned by Reichsminister Speer, in addition to the 130 already in production or completed, will not now be built so as to allow industrial capacity to be freed for other purposes. The Reichsmarschall intends to confer with Reichsminister Speer'.

The focus now was to build both piston-engined and jet fighters for the defence of the Reich. Yet ten days later the OKL diarist recorded, 'Operation *Eisenhammer* will be carried out at all costs. Preparations will be expedited. The fuel required for the operation has been promised by OKW'. The following day (13 February), 'After the fuel required for

Operation *Eisenhammer* had been provided by OKW, the Reichsmarschall decided that the operation will be prepared and carried out as soon as possible'. Twenty-four hours later, KG 200, now assigned by Göring to supervise all aspects of *Eisenhammer*, confirmed that, provided initial preparations were completed in time, it would be ready to undertake the operation 'as early as the end of February or beginning of March'.

OKL seized the moment, Oberst Eckhard Christian of the *Luftwaffenführungsstab* noting, 'KG 200's main objective is Operation *Eisenhammer*. All measures to be taken to accelerate preparations. Desired date of operation is the February/March moon period. As ordered, the *Kommodore* of KG 200, Oberstleutnant Baumbach, is responsible for preparation and execution – he must put all other matters aside and concentrate on this mission.'

On 17 March pilots from both KG 200 and KG(J) 30, as well as crews from the pathfinder units assigned to *Eisenhammer*, were ordered to Berlin for a week of secret briefings hosted by Professor Steinmann (who would outline the political and strategic objectives of the operation), Siegfried Holzbaur (who would cover technical aspects) and the *Kommodore* and senior officers from KG 200 (who would detail tactical methods to be used).

With the aid of vast wall maps, Baumbach and his staff outlined the attack plan. In the first leg, the whole attack force – *Mistel* led by Ju 88, Ju 188 and Ju 290 pathfinders – would fly north to Bornholm, where the course would be changed eastwards across the Baltic, to cross the coast north of Königsberg. Then, having flown over East Prussia and the old Soviet border, the second stage would take the formation along a highway from Minsk to Smolensk, where it would split. One group of *Mistel* would turn southeast to attack Stalinogorsk and Tula, while the remainder would continue east towards Gorki. Northwest of Moscow, one section would make for Rybinsk.

Following the attack, the Fw 190 upper components would head for designated landing strips in the Kurland Pocket – a salient of land just 150 kilometres wide backing onto the Baltic that the Red Army had rolled past during its advance into Poland. It was now defended by the remnants of *Heeresgruppe Nord* and protected by two *Gruppen* of fighters from JG 54. A consignment of 90 tons of fuel was flown into Kurland especially for the homeward-bound upper component fighters.

One officer of 3./KG(J) 30 recorded;

'During the middle of March, as training on the *Mistel* S2 ended, we began intensive target training at the *Luftkriegsschule* at Berlin-Gatow. The *Eisenhammer* targets were the steam and power plants around Moscow. The pilots were divided up into specific groups of three to six *Mistel*, each group assigned to a specific target. The briefings were detailed. Every group had its target presented to the minutest detail. There were aerial photographs taken from all directions and in all kinds of weather, as well as a three-dimensional model of the surrounding landscape.

'The groups spent many hours studying and discussing the best possible approach needed to destroy the turbine unit because this was the heart of the power plant. The targeting plans as well as the navigational plans were calculated and recalculated. The tight cockpit layout and emergency procedures were studied over and over again. Nobody doubted that they had the ability to manage this complicated machinery, and also to pull off

a perfect takeoff. Some had serious worries about making such a long flight without a crew, however. The target briefing ended with a visit to the power plant at Spandau, as well as a fly-over in a Ju 52/3m, making approaches to the plant from various directions. The purpose was to acquaint us with the dimensions and the position of the specific targets – which would be illuminated with lights. Whether theory and practice would coincide remained an open question.'

Feldwebel Karl Russmeyer was one of the 3./KG(J) 30 pilots who flew over Spandau, and he recalled;

'Professor Steinmann was disappointed that his proposal, originally made in 1943, had been adopted almost too late. He was reserved when delivering his talk, but he was precise and did not waste words. What he said was convincing. Steinmann showed us that the most important part of the power stations were the turbine houses for the simple reason that if the turbines were damaged, to repair them would take six months. The Russians were not in a position to build their own turbines. They were only capable of making temporary repairs, and therefore were unable to replace them.

'Steinmann had the original photographs of the powerhouse installations. Siemens had, in fact, delivered the turbines and had supplied the photos. These photos had been taken throughout the year, and thus showed all the different climatic conditions, so that the targets would be recognisable under any circumstances. Because of these photos, our pilots would not be surprised if there was bad weather, and would always be able to recognise the targets. So that we would become even more familiar with our target, we were all packed into a Ju 52/3m and flown to, and around, "the target" [Berlin-Spandau], where it was pointed out "That is the turbine house!"'

If nothing else, the organisation of the briefing impressed many of the *Mistel* pilots, as Oberleutnant Heinz Frommhold of 3./KG(J) 30 remembered;

'Besides pilots of all ranks, there were a great number of generals, representatives from industry, economic advisors and Party officials present. We were warned to maintain the strictest security and were not allowed to leave the premises. We were instructed about the operation and the targets, and were given the details of how the operation was to proceed. We were divided into specific target units. Each power plant was to be targeted by four to six *Mistel*. The targeting instructions were outstanding. Every detail was thought of, and by using detailed maps, photo-reconnaissance imagery and large dioramas, the targets were introduced to us. Each group spent hours working out the most efficient course of attack against the power stations.

'The turbine installations, as the heart of the power station, were the main target, and they were to be totally destroyed. During a visit to the power station at Berlin-Spandau in a Ju 52/3m we were able to observe from the air the large expanse of a power station, and were instructed as to where the heart of the station was. Course, headings, impact points (which were to be marked by the pathfinders) and target illumination was mentioned repeatedly and the proper documentation was handed out.

'In a general command session, the importance of the mission was made clear to us. Since the initially planned airfields in East Prussia were no longer available to us and the range was too great for a successful return of many machines, new landing fields were assigned to us inside the "Kurland Pocket". The question of whether planning and execution would mesh

Oberleutnant Heinz Frommhold commenced his operational career in the Luftwaffe with Ju 88-equipped I./KG 60 upon its formation at Tours, in France, in late 1942. At the end of that year he was posted to the *Gruppenstabsschwarm*, later to become the *Verbandsführerschule*/KG 101, with whom he was involved in the testing of dive-bombing equipment and dive-bombing tactics and procedures, such as high-altitude bombing and the use of rocket-powered bombs, under operational conditions with the Ju 88 in northern Russia and the Mediterranean. In May 1944 Frommhold was transferred to 3./KG 30, which, at the end of that year, as 3./KG(J) 30, re-equipped with the *Mistel*. He was one of the pilots briefed to fly the *Eisenhammer* operation

successfully was never answered. Despite the marking of the route and illumination of the power plants, pilots would reach their targets only after an eight-hour night flight. Following the attack, the pilot had to return to the Baltic in a fully tanked up Fw 190 – a distance of 1200 km, or about two-and-a-half hours' flying time in broad daylight. Was that possible? Each pilot had to answer this question for himself. For most pilots, this was a mission that made them a little nervous, but they were young and had a "devil may care" attitude, believing nothing could be changed.

'Just like the briefings, the personal equipment accorded us was excellent. In addition to a parachute, we carried mountain emergency gear, two flare pistols, a Walther PP 7.65 mm pistol, emergency rations in a backpack, medical kit in the knee pouch and a small pack that contained scissors, fishhooks, rope, 75,000 roubles and cartridges for the flare pistols. The Walther was strapped to the shinbone, watch and compass strapped to the wrist and there was a giant map with the course marked. It is hard to convey just how tight the cockpit of the Fw 190 was.'

Luftwaffe technical officer and *Mistel* pioneer Oberleutnant Dipl.-Ing. Horst-Dieter Lux was also heavily involved in preparations for the mission;

'At a secure facility models of the targets were built. The pilots were able to study them under all kinds of conditions, day and night, with and without snow, under good or bad visibility. A fantastic toy store, it kept the pilots busy – for security reasons they were not permitted to leave the premises. While the pilots got familiar with their targets, we in industry went into a three-shift production with 14,000 men. My development work and flight-testing kept me busy.

'With the forward thrust of the Russians, Germany lost vital airfields, which in turn forced us to increase the range of the "Piggyback" from one day to the next. Eventually, every cavity on the aircraft was filled with fuel. We also installed wing tanks. Furthermore, the Fw 190 was fitted with a long belly tank, which reached from five centimetres behind the propeller to the end of the fuselage. As time went on range became critical and I had to tell the Luftwaffe. To be certain, I was told to fly a simulated mission. The aircraft for the test had to have the exact weight of the operational version. The mass of the warhead was simulated with water and lead. We couldn't have used a proper bomb in any case, as the lower aircraft had to be brought back so that the residual fuel could be measured.

'I needed a pilot to fly the bomber, and since the Luftwaffe decided to make it a combined test, they gave me one of theirs. All he had to do was take control of the bomber after separation and land it. It sounds simple enough. It was not. Four pilots later I found one who stuck it out. The others left the project when they saw the test aircraft and experienced aborted attempts to fly the test. The Luftwaffe demanded a night takeoff. The aircraft was slowly, very slowly pulled to the end of the runway. The gear, which was originally designed for 10,866 kg, now had to carry 22,700 kg. While the aircraft was towed it made unnerving noises and when the whole test had to be aborted because of sudden fog or some glitch in the complicated system, it became too much for the young pilots and they departed. No doubt it was very taxing.

'My flight in the fighter lasted ten hours – six to the "target" and four home. I was shoehorned into the cockpit with a lot of extra gear and instrumentation, special food, a life jacket and other survival gear.

A Ju 88G-1 of 6./KG 200 in 1945. This aircraft is typical of the nightfighter variants that were converted into *Mistel*, the support structure visible behind the cockpit. Note the *Reparaturwerkstatt* in the centre of the fuselage *Balkenkreuz* and the large, crudely applied tactical recognition number '8' on the vertical stabiliser

Miraculously, after ten futile attempts to fly the test mission everything fell into place. The night was dark, but clear. The runway lights came on and I started the takeoff run. At the last moment I left the ground. The flight card instructed me to reduce power immediately after being airborne. Had I done so, we would have crashed. I needed every ounce of power to stay airborne. With takeoff power I staggered on. The weight loss of used fuel was enough to get me finally closer to the prescribed power schedule. At daybreak we started to have trouble. The pumps on the external wing tanks on the bomber failed. This cancelled the test. I separated from the fighter and let the bomber fly home, while I continued with the test programme for the fighter range.

'The flying was miserable. The long tank under the belly did not have enough baffles and the fuel was running either forward or aft, making the aircraft pretty unstable. I was so busy keeping the "rollercoaster" under control that I was startled when the radio suddenly came alive. I was told to land immediately. Allied bombers with fighter escorts were approaching. For them, I would have been a sitting duck. I was tempted to jettison the belly tank, but we needed to see how much fuel was left for our final range calculations. The half-full tank had all the makings of a bomb when touching the runway and grinding along on it. I decided to land on the grass and keep the tail up as long as possible. It worked. The tank did not explode or leak.'

Amongst the contingent from 6./KG 200 was Feldwebel Rudi Riedl who had recently returned from Denmark, where he had been due to take part in the ill-fated *Drachenhöhle* operation. He too remembers the unprecedented extent to which preparations were made;

'It was proposed that approximately 80 *Mistel* would put a number of hydro-electric dams out of action. We were brought together at the War Academy at Berlin-Gatow, and there we trained and prepared for possible operations. We had never before had so many prominent people in our company. Large models were available to us so that we could impress on our memories details of our targets.

'Timing was of the essence, because every drop of fuel was necessary for the return flight. A return flight to our point of departure could not be guaranteed with these suicide missions. The only course open to us was to fly to Kurland, where a small airstrip was held by our troops under the worst possible conditions. Each pilot had 75,000 roubles in a knapsack. We were expected to buy our freedom to the west in the event of an emergency landing. What an absurd thought, but then nothing in wartime is impossible.

'Hitler could wait no longer. He pestered and pestered, but no one could change the weather – not even him! We had to have stable weather conditions to carry out the attack. All return flights were based on this condition. The attack was planned to take place towards the end of March. Our route was to be marked with coloured flares dropped by a "pathfinder" unit. We all followed a central marker. Eight to nine groups were foreseen, and each had its own colour that it was required to follow all the way to the target.'

Leutnant Hans Altrogge was a pathfinder pilot from I./KG 66. Highly experienced on the Ju 88S, his navigation and flying skills would be crucial to the success of *Eisenhammer*;

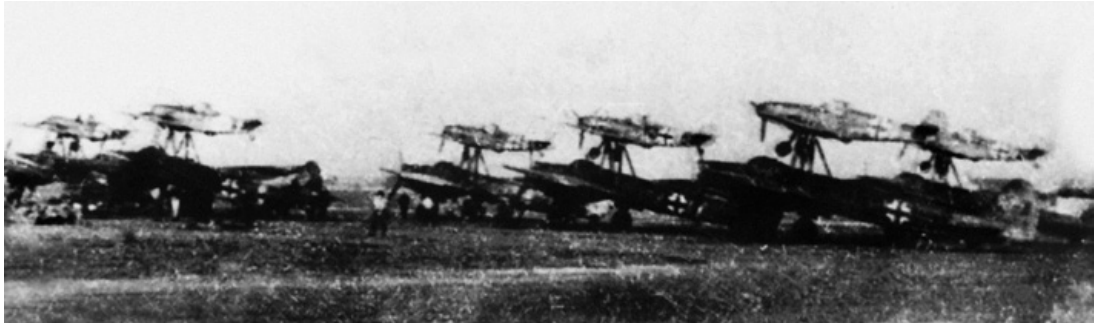
'By all standards, preparations for *Eisenhammer* were very thorough. I spent some five to seven weeks in total isolation with the other pilots at the *Kriegsschule* at Gatow. We were visited by experts in all different fields and we attended many briefings and lectures. These lectures included instruction on the Russian language, the Russian people and their culture, survival techniques and escape routes. Engineers who had built the power stations during the 1930s told us everything they knew about the plants, and especially about the turbines, which were the primary targets – where they were located within each station and which was the best approach. We were shown pictures taken from every angle in summer and winter. We had to learn everything by heart. By the end of it, I felt I had lived there all my life. You could have asked me things in my sleep.

'One thing, however, was concerning every pilot – the mental stress of knowing that the return was very, very risky. Even with the most favourable wind and weather conditions, there was a fuel margin of about three to five per cent. That's equal to zero! It was very worrying for us that we had to plan our escape not as a remote possibility but as a very real option. Some decided that they would head south and take a dinghy and a pocket full of roubles with them, but I always liked the snow and planned to go north. All these years later, it is one of those things which makes me wonder how people can proceed with their duties even though they know that they are on a "kamikaze" mission.'

Heinz Frommhold recalled;

'I was supposed to attack the power plant at Rybinsk with four other pilots. Just like the other target units and pilots, we spent most of our time going over and over our flight route so as to recalculate our navigational plan for the hundredth time and to acquaint ourselves with the peculiarities of the Fw 190 cockpit. We also made sure that all emergency equipment was checked out and tested for its practicality. We had no doubts about our ability to handle the complicated contraption, and even to successfully take off with the overloaded machine, but the thought of flying eight hours without a crew brought a bit of uneasiness to the pilots. I was familiar with Rybinsk from a previous attack and had lost an engine above the dam from anti-aircraft fire. Since you don't normally get hit in the same place twice, and on this occasion I had no choice but to fly back with one engine as that was all the Fw 190 had, my worries began to dissipate.'

With the briefings over, the pilots were moved to their respective operational airfields. Many of the former bomber pilots found the next few days of gruelling preparations on unfamiliar airfields difficult without the back-up they received from their usual groundcrews. However, even as the *Eisenhammer* briefings were taking place, events were rapidly overtaking German aspirations. By mid-March the Red Army was consolidating its position along the Oderbruch. The vital nodal point of the Küstrin 'fortress', spanning both the Oder and the Warthe rivers, were still in German hands, but the Soviet 5th Shock Army was about to advance on Golzow and the 8th Guards Army was poised to take Kietz.



The planners of *Eisenhammer* demanded that at least 150 *Mistel* were needed to carry out the operation, but only a fraction of that number was ever ready. This photograph, showing six *Mistel* S1s of II./KG 200 at Burg, is a rarity. Note how the aircraft are parked in a staggered fashion to facilitate takeoff in case some aircraft failed to start

On 18 March, just one day after the selected Luftwaffe crews arrived in Berlin, Koller advised Baumbach that even though the 'enemy offensive in the East may demand operations against the Oder bridges by units set aside for *Eisenhammer*', the operation was still regarded as of 'decisive importance, even under present circumstances. Preparations for Operation *Eisenhammer* to be pressed on with determination to enable operation to be carried out during the March moon period'.

Feldwebel Dietrich Deutsch of III(J)./KG 30, recalled;

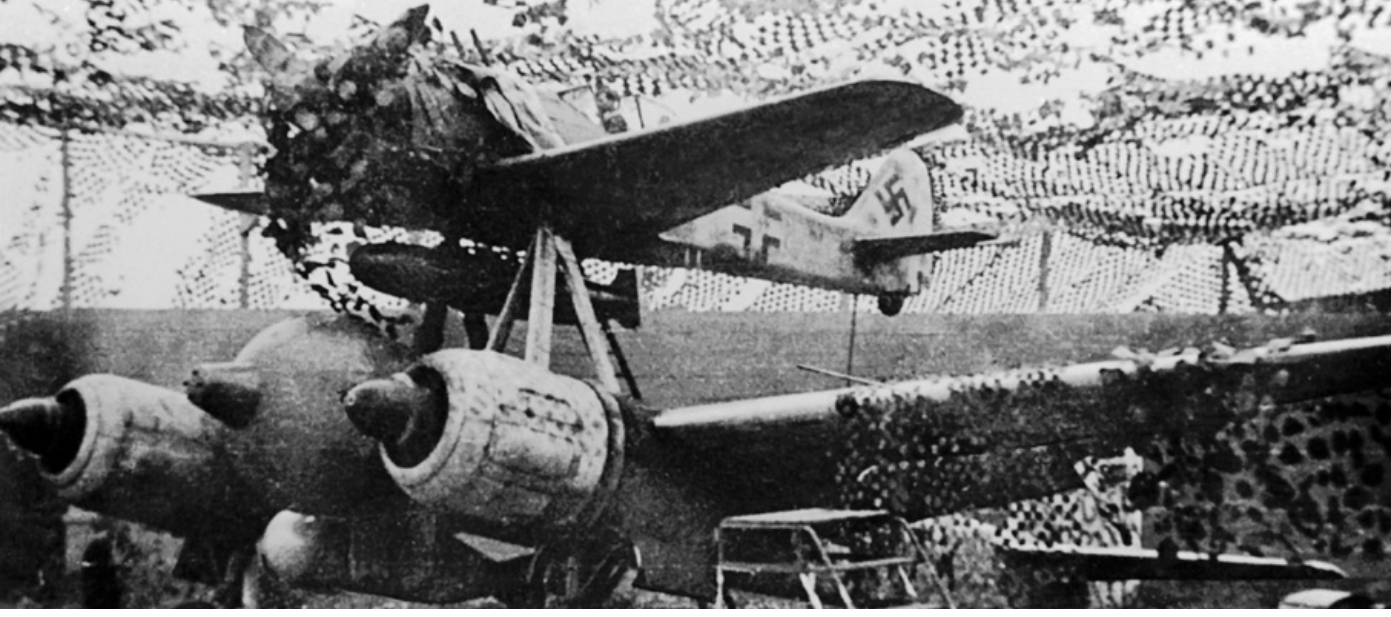
'Our takeoff time was set between 1600 and 1900 hrs. On all three of the possible days for the mission, we sat in our aircraft waiting for the signal. My airfield was Rechlin. The time went by without start orders coming through. We were disappointed because we did not know what was waiting for us – maybe infantry duty. At the same time, we felt slightly easier that we might not have to fly the "suicide" mission.'

By 29 March the garrison at Küstrin had surrendered to the Russians, who had punched a hole some 50 kilometres wide and ten kilometres deep into the crumbling German defensive line. Berlin lay in reach. For the Luftwaffe, weather conditions also hampered plans. On the 30th, Christian was forced to advise Steinmann and Baumbach that *Eisenhammer* was 'postponed for the time being'. Aircraft and crews earmarked for the operation were to be released for missions against the enemy bridges over the Vistula, although pilots involved in these attacks were to be 'pledged to secrecy, particularly in case of being taken prisoner. Operation *Eisenhammer* to be kept secret at all costs'.

On 10 April the US Eighth Air Force bombed Rechlin-Lärz and destroyed 18 *Mistel* – a significant part of the attack force. Oddly, despite the flames resulting from the air attack, several of the *Mistel* warheads failed to detonate, burning out slowly instead. At Oranienburg a raid by B-17s claimed another five *Mistel*, and an additional six Fw 190 upper components were destroyed when bombs fell on the Lufthansa facilities in which they were hangared. Operation *Eisenhammer* was over.

In a comment to the author, Heinz Frommhold perhaps encapsulated the sense of frustration felt by many of the pilots;

'Back in 1945, I was sure we could make it [to the power plants]. Today, I still think that, bearing in mind the situation behind the Soviet lines all the way to the Moscow area. We really could have made it. Not that it would have changed the course of the war, but we could have been successful in destroying a considerable number of power plants.'



CHAPTER SIX

BATTLES AT THE ODER AND THE VISTULA

A *Mistel* S2 of KG(J) 30 at its camouflaged dispersal at Oranienburg in March 1945. The Ju 88G-1 has been fitted with an SHL 3500 'short' fuse warhead (*Sprengkopf ohne Elefantenrüssel*) and carries a 900-litre fuselage-mounted drop tank, whilst the Fw 190F-8 is fitted with a 600-litre drop tank. The drop tanks suggest a *Mistel* that had been slated for Operation *Eisenhammer*

As early as 15 January 1945, in a brave aside, an SS officer on Hitler's staff was heard to quip in his leader's presence, 'Berlin will be most practical as our headquarters – we'll soon be able to take the streetcar from the Eastern to the Western Front!'

Even if a somewhat candid remark, it was not without reality. As February began, temperatures in the East rose and the snow melted, thawing the ground. It was a grave time for the German people and their armies. Upper Silesia had been lost to the Soviets, and in East Prussia, German forces were being worn down. On the 2nd, as the Red Army spearhead reached the Oder at Zellin, Hitler ordered *Reichsführer*-SS Heinrich Himmler and his Army Group Vistula to maintain a line on the Oder upstream from Schwedt and around Stargard in preparation for an attack by the 2nd Guards Tank Army. They were also to hold back any Soviet thrust into Pomerania or West Prussia. The Germans clung on to the bridgeheads at Küstrin and Frankfurt-on-the-Oder, but Soviet troops seized key points north of Küstrin and south of Frankfurt.

During mid-February the Second Belorussian Front pressed its attack through the woods and swamps of West Prussia. Himmler's Army Group somehow checked the enemy advance and it ground to a halt on the 19th.

Five days earlier, however, as the fires raged in Dresden following the Allied bombing of the city, the Third Belorussian Front and First Baltic Front had isolated Königsberg. It seemed nothing could stop the 'Red tide'.

On 1 March II./KG 200 at Burg had six *Mistel* S1s, eight *Mistel* S3s, nine pathfinder aircraft, three reserve machines and a weather reconnaissance aeroplane on strength. From the *Geschwader*'s new *Gefechtsstand* at Stendal, KG 200's operations officer, Major Adolf von Harnier, ordered a strike against the railway bridges at Warsaw, Deblin and Sandomierz under the direction of Oberleutnant Pilz, using flare paths and under escort from fighters of the II. *Fliegerkorps*, but deteriorating weather frustrated the plan.

An entry in the diary of the Luftwaffe's head of technical development for the week ending 4 March 1945 recorded, 'The DFS has completed the installation of wire guidance in a *Beethoven* combination. Testing in flight without separation, it gave faultless direction transmission. Testing with separation and target-aiming run follows immediately'. These photographs show a composite so fitted, with clear views of the spool containers – two fitted to the Bf 109 and two to the Ju 88A-4. The Bf 109 appears to be an F variant – note the Octane triangle position. However, the small air intakes on the front of the cowling confirm that the aircraft is fitted with a DB 605 engine

The next day, P-51s from the 357th FG strafed the airfield at Kamenz, destroying or damaging ten newly completed *Mistel* intended for II./KG 200.

On 5 March, Oberst Joachim Helbig, having recovered from wounds suffered in September 1944, was appointed by Baumbach to establish a 'new' *Gefechtsverband Helbig* charged with coordinating air attacks against the Oder bridges and subordinate to KG 200. In a report to Baumbach, Helbig stated that it was necessary to conduct 'immediate attacks against the crucial Oder and Vistula rail bridges', combined with 'sudden attacks on the most important Oder bridges during the first days of the enemy offensive against Berlin'.

Three days later, *Luftflottenkommando* 6 issued orders for a strike against the pontoon bridges and rope ferries at Göritz, using Hs 293 guided bombs and *Mistel*. *Gefechtsverband Helbig* deployed four *Mistel* with two Ju 88s and five Ju 188s from II./KG 200 for the attack, the Junkers carrying AB 500 weapons containers packed with SD 1 fragmentation bombs. The formation took off between 0900-0920 hrs, maintaining radio silence, and the first *Mistel* was over the bridges between 1000-1012 hrs. A low cloud base at 3000 metres prevented a surprise attack and the Ju 88s and Ju 188s had to attack simultaneously with the *Mistel*, making a 'gliding' approach run from 3000 metres down to 800 metres and bombing anti-aircraft positions around the target to enable a safe approach for the composites. One *Mistel* narrowly missed the south bridge at 1006 hrs and hit the west bank of the river between the two bridges, leaving a large crater, but the centre of the north bridge was destroyed.

One composite was lost as a result of a technical failure when Feldwebel Friedhelm Elger was forced to bail out of his Bf 109F-4 near Belzig.

Col General Chuikov, commander of the Soviet 8th Guards Army, wrote of the time he first witnessed the *Mistel* in action;

'Lacking the strength to repel our attacks on the bridgehead, the enemy struck back with every means he had, including unmanned auto-piloted aircraft packed with explosives. I first saw this "secret weapon", which

Goebbels had so widely advertised, in action on the Oder when our engineers were building the first bridge across the river at Górzyca (Göritz). It was a fine sunny day. Gen Pozharsky and I were at an observation post nearby when we noticed a twin-engined aircraft flying low from the west. Passing over Height 81.5, it began to lose altitude, and about 300 metres from the river it dived, hit the ground and exploded. The Germans used four such aeroplanes in an attempt to blow up the bridge but none hit the target. They made huge craters without, however, causing much damage. We wondered whether the game was really worth the stakes. The employment of such an expensive weapon against a bridge under construction was unjustified extravagance.'

On the 9th another attack on the Göritz bridges was planned by *Luftflottenkommando* 6, using three *Mistel* against each bridge in conjunction with ground-attack aircraft. However, the operation was cancelled due to adverse weather conditions. *Mistel* would not be seen in action again for several weeks, but in late March KG(J) 30 was preparing to carry out operations over the Oder bridges. On the 23rd, Oberst Helbig issued operational orders to the *Geschwader* in which he stressed that, 'For the Luftwaffe there is only one categorical imperative, and that is to destroy these bridges with all available means'.

Meanwhile, in the West, from 22 March *Luftwaffenkommando West* launched a series of desperate attacks against American troop and vehicle concentrations and the pontoon bridges near Oppenheim over which General Patton's Third Army was crossing. But the *Luftwaffenkommando*'s Ju 87s and bomb-carrying Bf 109s and Fw 190s lacked sufficient heavy ordnance to sink the pontoons. The *Mistel* of II./KG 200 were called in on the evening of 25 March when four *Mistel* S3s of 6./KG 200 took off from Burg, led by five pathfinders from 5./KG 200. For Leutnant Alfred Lew, a former blind-flying instructor who had transferred to 6./KG 200 in January 1945, the Oppenheim mission was his first in the *Mistel*. He recalled;

'We had five Ju 88/Fw 190 *Mistel* combinations ready for the Oppenheim Rhine bridge attack. Around 1700 hrs, four *Mistel* took off, the fifth combination having broken down on the airfield. We were accompanied by five Ju 88s and Ju 188 *Beleuchter* from our 5. *Staffel*. Since takeoff in a *Mistel* was always a dangerous affair, the air raid siren was sounded at Burg to clear the field of personnel for their own safety. This time, however, things went according to plan and the four remaining *Mistel* got off the ground without problem. Following a wide left turn, our formation headed towards the Rhine. Initially, we were at 1500 metres, but we soon climbed to a cruising altitude of 2000 metres. The approach flight took two-and-a-half hours.

'As it began to turn dark, so I saw the River Rhine glittering below us in the moonlight. Meanwhile, our *Beleuchter* aircraft had dropped their signal flares, but still I could not recognise the bridge. I flew a full circle to orientate myself, but as I did so I ran into heavy American anti-aircraft fire. In order to locate the target, I descended to 1500 metres and then – *Bang!* – I was hit. My *Mistel* lurched to port and went into a spin on its back. As I was no longer able to control the machine, I decided to separate my Fw 190 while simultaneously diving away from the *Mistel*. At 300-400 metres, I finally managed to regain control of my aircraft and get away from that terrible flak, heading east towards Burg.

On 22 March 1945, Leutnant Alfred Lew of 6./KG 200 was assigned the task of destroying the pontoon bridges over the Rhine near Oppenheim. 'Fred' Lew had joined the Luftwaffe in July 1940, and from January 1941 until June 1942 he attended the A/B *Schule* at Plauen, before moving to the FFS C 9 at Pretzsch/Elbe. In April 1943 he commenced a flying instructor's course at Pretzsch, after which he spent three months as a trainee staff officer at the *Luftkriegsschule* 9 in Tschenstochau. From June to September 1944 Lew saw operational service flying He 111s with the *Einsatzgruppe* of the 2. *Fliegerschuldivision* at Borissow, before taking up a post as a blind-flying instructor at Burg in September 1944. He then transferred to 6./KG 200 in January 1945 and commenced conversion to the *Mistel*

'In the darkness, flying on instruments, my return flight became quite hairy and I flew off course. I found myself approaching the River Elbe. Since the Russians were quite close by that stage, it was dangerous to cross the river. Fortunately, I reached the Elbe at Torgau. Now my experience as a flying instructor became very useful and I managed to find my way home. At 2200 hrs I landed safely at Burg. One *Mistel* pilot, another former flying instructor, did not make it back from the mission. The success of the operation was virtually nil.'

On 31 March six *Mistel* S1s from 6./KG 200 took off from Burg at around 0730 hrs to attack the railway bridge at Steinau, some 300 kilometres to the east of their base. Total radio silence was observed. Two Ju 88s and two Ju 188s from 5./KG 200 flew as *Zielfinder* and long-range escort. Additionally, 24 Bf 109s from JG 52 would rendezvous with the KG 200 formation over Waldenburg.

Shortly after takeoff at 0736 hrs, one *Mistel* suffered a hydraulics failure at 70 metres and was unable to retract its gear. The pilot effected separation with an unarmed warhead, which hit the ground near Genthin. Another *Mistel* made it as far as the rendezvous with the fighters near Waldenburg, when the engine of the Bf 109F-4 cut out. Its pilot was unable to restart and commenced a return course to Burg. Eighty minutes later, the port-side engine on the Ju 88 started vibrating, and with a live warhead, separation was effected in the Prettin-Torgau area. The lower component was seen to explode in a field. The Bf 109 crashed near Prettin and was listed as a total loss, the pilot escaping with a broken leg.

A third *Mistel* got as far as Görlitz, at which point the Bf 109's engined failed. Emergency separation took place near Lauban and the fighter crash-landed near Görlitz with 60 per cent damage. Then, at 0845 hrs, the composites endured friendly fire from local light flak. The remaining composites reached their target at 0905 hrs and launched glide attacks from 2500 metres, descending to 200 metres, through six-tenths cloud and light flak. The first *Mistel* was launched, despite suffering rudder failure, at the centre section of the bridge, but the effect of the impact was not observed amidst the Soviet smoke screen. Following launch, the pilot of the Bf 109 strafed Red Army infantry positions before climbing and turning for home. The second composite scored a direct hit on the eastern section of the bridge and the third also hit the centre section following a trouble-free launch, although the effect of impact was not observed.

Immediate post-strike reconnaissance showed serious damage to the western end of the bridge as a result of a *Mistel* hit – probably the aircraft that was seen to hit the centre section.

The next day, 1 April 1945, Adolf Hitler relocated his headquarters from the Chancellery building in Berlin to a deep bunker complex just behind it. It was a move redolent of defeat. In Moscow the same day, Josef Stalin airily enquired of his commanders, 'Well, now, who is going to take Berlin, we or the Allies?'

Six days later, on the 6th, I./KG(J) 30, was assigned what was probably its first mission against the bridges, Oberfähnrich Georg Gutsche recalling;

'From Rechlin, our mission field for Operation *Eisenhammer*, we were ordered to attack the Oder bridges south of Stettin, over which came the

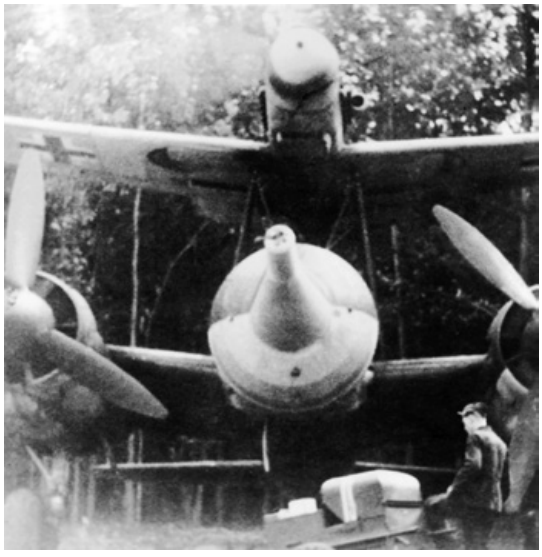
supplies for the Russian armies attacking the northern sector of the front. Takeoff was set for 1700 hrs. The aircraft were lined up one behind the other with engines running. My *Mistel* was the second one in line. From my cockpit, I could not see the horizon because the nose of my Fw 190 was pointing up too high. The procedure was to move all three throttles forward in such a way that the *Mistel* could be kept on the runway. With sufficient airspeed, the stick could be pulled back and the undercarriage and flaps retracted. You then throttled back, adjusted the airscrews and made a steady climb.

'After reaching our combat altitude of 2000 metres, I could see the front, the fires and the impact of shelling. The heavy haze made visual orientation very difficult, but the River Oder was easy to make out as a silvery band. The bridge that I was looking for was a dark line across this band. I was "welcomed" by heavy anti-aircraft fire, so I put the *Mistel* into a dive, switched on the fully automatic control system, pulled down the crosshair sight and aimed at the bridge. When the target drifted out of the crosshair sight, I corrected and the automatic control system put the target squarely into the crosshair again. From a distance of about 1000 metres I squeezed the trigger that automatically armed the warhead and separated the *Mistel*. My Fw 190 climbed as it released itself from the heavy weight of the Ju 88. As I pulled away, I noticed a lightning flash on the riverbed below me that quickly went out. Without much difficulty I returned to my home field.'

On 7 April I. and II./KG(J) 30 were ordered to attack the enemy-held bridges near Thorn, Warsaw and Deblin, as well as a Soviet headquarters near Tarnow. Airfields allocated to the mission were Peenemünde, Oranienburg, Parchim and Rechlin-Lärz, with takeoff for the six *Mistel* S3s at each airfield set for midnight.

An NCO pilot cautiously grasps a support strut of a *Mistel* S2 at Löbnitz in the winter of 1944/45. He is probably about to ascend the wooden ladder to the Fw 190, or has just descended. The Fw 190F-8 is fitted with an ETC 501 bomb rack, which, although an indicator of its intended ground-attack role, was probably used for the carriage of a drop tank for extended-range composite missions

Things got off to a bad start when B-17s of the Eighth Air Force bombed Parchim during the afternoon. Hangars were destroyed and other buildings and workshops heavily damaged. Some 30 aircraft were also destroyed, including four *Mistel*. The runways were badly cratered and it was estimated that it would take two days to restore them to serviceable standard. This meant that the undamaged *Mistel* slated to make the attack on the Thorn bridges could not move. It was decided to divert the composites based at Oranienburg, which had previously been allocated to strike at Tarnow, to attack the targets at Thorn. However, just as the operational plans were being changed, the weather turned bad and the mission was postponed. It was to be no better at Peenemünde, as Oberleutnant Heinz Frommhold of 3./KG(J) 30 recalled;



The engine runs up on the Bf 109 of this *Mistel* S1 combination parked in trees to the edge of an airfield somewhere in Germany. The four fuse prongs are visible at the tip of the warhead, and a mechanic prepares to move a mobile generator cart away. By 1945, with bomb-damaged runways and the constant threat of enemy air attack, just moving *Mistel* out for takeoff was a difficult enough and hazardous operation

'The flight plan took us over Schneidemühl and Kutno to the Vistula estuary, north of Deblin. The return would be due west to the River Warthe, then north to Posen, to Stargard and then directly to the airfield. All turning points and the target – a railway bridge – were supposed to be illuminated. Flying time was estimated at five hours. The weather was supposed to be good – visibility 30 km, cloud three-tenths Cumulus, with Cirrus above.

'At 2300 hrs we were ordered to our aircraft. We climbed up to the cockpits of the Fw 190s with the aid of a four-and-a-half metre ladder and made ourselves "comfortable" in the confines of the very tight space. Then the siren went off. Everyone not directly involved in the *Mistel* takeoff took cover. A minimum of manpower was to be put at risk in case one of the hollow charge warheads went off by accident. At the same time, the electrical and hydraulics specialists conducted their last checks on the steering mechanism. The "thumbs up" was given.

'Meanwhile, the mechanics had connected the engines to the starters, and when the signal was given, I started the engine of the Fw 190 and then the left and right engines of the Ju 88. All three BMW 801s started without any problems. Then I ran through my checklist – trim at zero; flaps in the "Start" position; propeller setting first at 12 o'clock then to "Automatic"; rudder to "Start" position; a quick glance at the release button for my highly explosive "companion". Safety on! Turn on compass and set landing gear lock. Now I could give my hand signal for takeoff. I must admit that my heart beat faster than normal. Meanwhile, the first aircraft had rolled to the starting position and disappeared off into the darkness.'

This first composite, which was piloted by Hauptmann Peter-Heinz 'Pitt' Nolte, the *Staffelkapitän* of 4./KG(J) 30, suffered a burst port-side tyre. The weight of the *Mistel* broke the landing gear and the support struts buckled, the Fw 190A-8 sliding from above the Ju 88G-1, with both aircraft collapsing onto the grass at the side of the runway. Heinz Frommhold was in the *Mistel* behind Nolte;

'Suddenly – barely visible over my engine – sparks flashed all across the runway. Down below, next to me, a red light blinked. My first thought was, "The warhead is going to go sky high! Get out!" I don't know how, but within

seconds I cut the engines and was sprawled flat on the ground. Behind me, the pilot in the next takeoff position showed reactions as fast as mine.'

The warhead on Nolte's aircraft began to burn. The mission leader immediately called off the operation and clambered down from his cockpit, ordering all personnel to evacuate the runway area. As the runway was closed and sealed off, so the warhead continued to burn, yet did not explode, much to the amazement of all those now watching from a safe distance. Eventually, the airfield fire crews set about extinguishing the fire and, as they did so a foam-covered figure emerged from the darkness, carrying his parachute under his arm and 'cursing violently'. Hauptmann Nolte was unhurt. Only the facts that the runway was completely unusable and the allocated takeoff time had been missed convinced him to abandon his thoughts of a second attempt in another aircraft. Another *Mistel*, piloted by Feldwebel Lukaschek, swung off the runway, crashed into a revetment and exploded. Lukaschek was killed.

Five *Mistel* actually got airborne from Rechlin-Lärz, but the first one into the air, at 0023 hrs, was attacked by a Soviet fighter and the pilot was forced to make an emergency separation, after which he belly-landed his Fw 190A-8. Two more composites had fuel transfer difficulties and the pilots bailed out over Müncheberg and Güstrow, whilst a fourth machine experienced stability problems and its pilot also abandoned his aircraft. Only the one remaining *Mistel,* flown by Oberfähnrich Burkhardt Winkler-Hermaden of 1./KG(J) 30, reached the railway bridge at Warsaw. He recalled;

'I took off at 0025 hrs from Rechlin-Lärz with orders to destroy the railway bridge over the Vistula at Warsaw. The approach was uneventful, and after two hours in the air I reached Warsaw. The heavy flak defences immediately went into action. I was able to make out the target since a few flares were still illuminating the Vistula bridges. I immediately attacked. Despite the strength of the defences, I was able to get close to the target. Having obtained the right angle of attack, I was ready to separate in my Fw 190. Nothing happened, and I was forced to fly right over the target and try to gain altitude again. The density of the flak increased and I was caught in a searchlight beam. I was only able to escape by adopting violent defensive manoeuvres, and then I tried to climb for another attack.

'I tried the emergency separation procedure to get rid of the Ju 88 as I made my attack. Still the attempt at separation failed. I had no alternative but to pull up again with the *Mistel* intact and expose myself to further anti-aircraft fire. I could not escape the searchlights. After once again having gained enough altitude, I went into a steep glide approach, my airspeed rose drastically and I pulled the *Mistel* up steeply. It worked! The Ju 88 broke away at the normal separation points and I was free. Now, nothing else but to head west!

'Once away from the flak and the searchlights, I noticed that I had lost my auxiliary fuel tanks during the violent manoeuvre that I had had to perform to get rid of my explosive "guest". I decided to climb to a favourable altitude and then throttle back on my engine to save fuel and increase my range. I tried to call up Prague-Ruzyne on the radio, and eventually I managed to make contact – the response was "Please wait" followed by a crackling noise, and then I lost contact. Stubbornly, I continued heading west and eventually crossed the frontlines, whereupon

On 7 April 1945, Oberfähnrich Burkhardt Winkler-Hermaden of 1./KG(J) 30 was tasked with attacking a railway bridge in the Warsaw area at night. He made a dramatic approach to the target, his *Mistel* exposed to Soviet searchlights and anti-aircraft fire. 'I knew that I would have to prepare for a parachute jump', he later recalled

I began firing recognition flares. However, despite firing several flares, not a single airfield turned on its lights.

'My calculations told me that I must be somewhere around Berlin or even further west, so I changed my heading to the south. My fuel supply dwindled and I was out of emergency flares. Soon I knew that I would have to prepare for a parachute jump. It was a very dark night – no lights in sight. Get ready to jump. How many times had I practised that procedure? Theoretically, it was as follows – unbuckle, jettison the canopy, give the stick a kick with your boot, get thrown out, count "21, 22, 23" and pull the rip cord. Indeed, this was how things transpired until the parachute unfurled with one hard jolt, and I swayed under its open shroud at 2500 metres, surrounded by darkness. The only sound was the air rushing around the 'chute.

'Suddenly, there was a loud thud – my aircraft had exploded upon impact with the ground. All my flares were gone and I could not see the ground. Moments later, however, I could make out the shape of a forest below, and I pulled on the lines of the parachute to try to avoid it. Then I was down, lying on my back in a field. Happily, I clawed at Mother Earth. It was 0500 hrs – four-and-a-half hours since takeoff.

'Physically, I was in good shape, so I gathered up my parachute and thought about which direction I should take. It began to get lighter and I eventually arrived in a village. I knocked at the first illuminated window, which opened, and I identified myself as a German airman. I later tried to search for the wreck of my Fw 190. There was just a large crater in the ground – small pieces of wreckage, nothing else. From the village, I contacted my unit. I told them I would make my way to Rechlin-Lärz. After four days of hitchhiking, via Berlin, I reached my unit.'

Oberfähnrich Georg Gutsche of I./KG(J) 30 recalled;

'The day's targets were the Oder bridges again, and we were to start from Parchim. Around noon [on 7 April], however, a formation of B-17s destroyed the runway and we could not take off. We were driven to Rostock-Marienehe in order to fly a mission against the bridges near Greifenhagen. There were two bridges here – one normal bridge and one pontoon bridge right below the water's surface, and both were being used by the Soviets. This time the haze was so bad that during the first approach I could barely make out the bridge, and so I flew a second approach and released the payload more or less haphazardly.

'The return flight presented no problem at all. The landing lights were on when I landed. Then something happened that can only be called pure "pilot's luck". My aircraft landed on the right wheel first and broke to the right. With some hard right rudder action, I was able to bring the aircraft on a parallel course to the runway, which was now about 50 metres away. Almost as if in a dream, I saw a concrete triangle in front of me as I brought the Fw 190 to a standstill. Some infantrymen suddenly appeared in front of me, screaming "You just took our tent with you!" I climbed out of my aircraft and found myself standing on a triangular concrete block. The wheels of my aircraft had rolled between many of these concrete anti-tank blocks – it was my birthday and a very good reason to have a celebration!'

Oberst Helbig viewed the events of 7-8 April as a fiasco, blaming the small number of functioning *Mistel* on the excessive weight placed on

the tyres of Ju 88s that had been parked for too long in one place. Furthermore, although night takeoffs were not considered to be the reason for so many breakdowns, Helbig was of the view that the practicality of such starts was over-estimated, and that in future only daylight takeoffs or sufficiently illuminated starts would be effected. He subsequently produced a bleak assessment of KG(J) 30's activities;

'Due to the *Mistel*'s complexity and the difficult combination of so many technical requirements, a successful mission can only be flown if the unit has enough operational experience with this aircraft. In the case of KG 30(J) this experience was lacking. A unit must have a single, precisely defined mission, and all details for this mission should be worked out. There should be no parallel mission planned. Until 6 April, the units designated for Operation *Eisenhammer* had to be diverted to attack the Vistula bridges. Due to the complicated technical nature of the *Mistel* this is impossible because of organisational and leadership reasons. A *Mistel* unit at this time, even with more operational experience, can only achieve limited success under the variable operational requirements [target changes, night missions, weather and fighter escort by day].'

Helbig did not spare his criticism of KG(J) 30's leadership either;

'Takeoff preparations have to be handled by the *Kommandeure* and *Staffelkapitäne* in a more intensive manner because of the technical and organisational problems. Above all, they have to act more responsibly. Furthermore, the unit has to act as a cohesive military unit, and under no circumstances should a broken up unit be used on possible other missions such as Operation *Eisenhammer*.

'The takeoff weight problem will be a problem in the future because of the long periods that the aircraft are parked. The number of takeoff accidents will increase. The rough surface of the airfields at Rostock and Peenemünde require tyre changes even before aircraft can takeoff. At this time the required replacements are not available, and they will be unavailable in the future when one considers the current production and raw material situation.

'Being forced to return to base in the Fw 190 during the darkest of nights despite having no single-seat nightfighter experience [and despite all navigational and landing aids] has a negative and morale-sapping effect on the pilot, and usually results in the unjustifiable loss of the pilot and his aircraft.'

On 10 April *Luftflottenkommando* 6 ordered *Gefechtsverband Helbig* to launch *Mistel* strikes against the Steinau railway bridge and the Autobahn bridges across the Rivers Bober and Queis under the codenames *Steppenritt* (Ride over the Steppes) and *Hexentanz* (Witches Dance), respectively. That afternoon, however, II./KG 200's base at Burg was bombed by the Eighth Air Force as part of a more wide-ranging attack mounted against the network of airfields defending Berlin. The raid was to prove catastrophic for the German units based there. Hangars and workshops were badly damaged and at least 200 bombs fell on the runways and taxi tracks, which were declared unusable as a result. At Oranienburg five *Mistel* were destroyed by the bombing, and at Rechlin-Lärz the runway was left unusable and 29 aircraft destroyed (including a *Mistel*, which was targeted in a strafing attack by a P-47 of the 56th FG), with a further 45 damaged.

A lone *Mistel* S2 from 6./KG 200 took off from Peenemünde and targeted the railway and road bridge at Neuhammer that spanned the River Neisse, southeast of Görlitz. Its pilot, Feldwebel Carl-Ernst Mengel, was a Ju 88 flying instructor who had been posted to II./KG 200. Having received basic training on the Bf 109 at Stolp during the winter of 1944, Mengel was then given conversion training onto the *Mistel* at Burg. He recalled;

'I flew my last operational sortie from Peenemünde on 10 April. My target was the viaduct (railway and road bridge) over the Neisse, southeast of Görlitz. I was fired on by a Russian MiG [almost certainly a Yak fighter] while I was descending steeply towards the viaduct. After separating from the Ju 88, there was smoke in the cockpit and the propeller pitch indicator needle was swinging towards the "feather" position. I quickly switched off the propeller pitch control, but I could only coax 220 km/h out of the crate, even at full throttle. Because the left undercarriage leg was hanging down and the ground was coming ever closer, I extended the right undercarriage and made a landing in open country. Thank heavens the Fw 190 did not tip over onto its nose. I put in a call to Görlitz and the machine and I were picked up. The next day I was sent by train through the burning ruins of Berlin back to Usedom. Although six Fw 190s were available at Görlitz, nobody would give me one. A few days later they were blown up.'

Previously a Ju 88 flying instructor with the FFS B 9, Feldwebel Carl-Ernst Mengel was posted to II./KG 200 in late 1944. On 10 April 1945 he was tasked with launching a Ju 88 at the railway and road bridge over the Neisse, southeast of Görlitz. He was attacked by a Soviet fighter in the process

Elsewhere on the 10th, 3./KG(J) 30, under Oberleutnant Rudolf Kainz, arrived at Rostock-Marienehe to collect new *Mistel*, having staged via Pardubice, Prague-Ruzyne and Peenemünde. For some weeks the *Staffel* had been dispersed in preparation for *Eisenhammer*, as the unit's diary of events records;

'The 3. *Staffel* assembled at Rostock-Marienehe and was together again after two months. The pilots and ground personnel arrived in buses from the scattered *Eisenhammer* airfields, with those from Peenemünde and Fürth arriving by train. The train journey ended at Tangermünde, on the River Elbe. All equipment had to be transferred to *Staffel*-operated transport. This proved to be insufficient and much equipment had to be destroyed. At Marienehe, the *Mistel* S2s on the airfield had to be brought to operational status immediately, which presented the groundcrews with round-the-clock work. The pilots, meanwhile, had to prepare themselves for a new type of mission – the destruction of the Oder bridges. That meant formation flying with fighter protection.'

The great metal girder bridges spanning the River Oder at Küstrin were vital elements in the Soviet advance westwards towards Germany in mid-April 1945. As such, they became priority targets for the *Mistel* of II./KG 200 and I./KG(J) 30

Inexorably, the war ground on. Soviet forces had reached the centre of Vienna by 11 April, while that same day American troops arrived at the Elbe, just south of Wittenberge and only 137 kilometres from the centre of Berlin.

Twenty-four hours earlier, four of the eight or nine *Mistel* that were on the strength of 6./KG 200 were transferred from Burg to

Peenemünde, having been assigned for a mission to attack the bridges at Küstrin, accompanied by a fighter escort and the *Zielfinder* (pathfinder) of I./KG 66. Surrounded by low-lying marshland, the fortress town of Küstrin was sited on an important Oder crossing point just 80 kilometres east of Berlin. A complex of factories that sprawled across the banks of both the Oder and the Warthe, the town was approachable only by narrow roads. By late March Küstrin had been cut off and surrounded by Soviet forces, and it finally fell to the Red Army on the night of the 28th. On 12 April the Soviet First Belorussian Front commenced preliminary attacks with a view to expanding the depth of the Küstrin 'bulge' in the German frontline in order to assemble large troop concentrations in the area.

The *Mistel* strike force set a course from Peenemünde to Straussberg, where a rendezvous would be made with a fighter escort. Feldwebel Fritz Lorbach of 6./KG 200 remembers the start of the operation, which took place on 12 April;

'The evening prior to the mission, our *Huckepacks* were lined up on the runway at Peenemünde, facing into the wind. We had also received our orders concerning our targets – the bridges at Küstrin – during the day. The whole airfield was covered in bomb craters, but the damage to the concrete runway had been repaired immediately. Rudi Riedl was to be in the third of the four composites lined up for takeoff. The *Mistel* were staggered so that one could still take off should the other fail to start.

'In the morning, we discovered the wind had turned and was blowing at 15 km/h in the opposite direction! It was felt that a start from the other end of the runway was not possible because of the extra stress it would have imposed on the *Mistel*'s undercarriage. Therefore, it was decided to take off with a tailwind. Willi Büllesfeld and I volunteered to mark the point of lift-off for the aircraft. We clamped red, yellow, green and white marker pennants and a hammer under our arms and set off. At the third *Mistel*, Willi Büllesfeld clambered up the pilot's ladder to wish Rudi '*Hals und Beinbruch*' (good luck) and to come back in one piece. He clambered back down the ladder with tears in his eyes. We then carried on to set out the markers, spacing them between 1200 and 1800 metres from the start position. The normal takeoff, depending on the strength of the wind, was 800 to 1000 metres.

'We crawled into the nearest bomb crater and hardened ourselves against the worst. The first *Mistel* began to roll in a straight line, and it rolled and rolled until, at 1800 metres, it lifted off and, at first climbed normally, until suddenly it began to climb very steeply. Luckily, it was already beyond the edge of the airfield. The pilot separated his Fw 190 and made a smooth landing. The *Mistel*'s lower component rolled to the right and plunged into the Baltic.

'The second rolled about 1000 metres then the left tyre burst and he headed straight for us. We didn't stay to watch, disappearing into the crater. Nothing happened. We peered over the edge. The fire brigade – experienced men and young girls called up for service – had already pulled the pilot out of the burning heap. Strangely, the warhead did not explode – it just burned with the wreck.

'The next pilot – Rudi – prepared for takeoff. His was an example straight out of the textbook. Despite the crash and the burning aircraft

around him, his *Mistel* lifted off at 1600 metres and turned left on course for Straussberg. The longest takeoff run was 2200 metres. The fourth aircraft failed to take off.'

Once airborne, Feldwebel Riedl steered a course towards Straussberg, as he recalled;

'Our orders for the *Mistel* attack on the railway bridges at Küstrin called for us to fly from Peenemünde to Straussberg at low level in the hope that we could hide ourselves from Allied fighters that roamed around Germany like fish in a large ocean. Our fighter pilots at the time were making a superhuman effort, but they were being pitted against overwhelming odds. I found it fun flying at 100 metres above the ground.

'Near Straussberg, we had to climb to combat altitude and fly a complete circuit while awaiting our fighter escort. I looked around anxiously – I couldn't see anything. Suddenly, there was an enormous shadow over me and I was shocked to the core. Then this Bf 109 was sitting on my right wing – I couldn't believe my eyes. The chap must have dived on me like a hawk. I was pretty cross because he could have brought us both down, but the rascal waved to me and was laughing, and we just greeted each other like two old friends. Together, we flew to Küstrin.

'Everything in the air and down on the ground was very quiet – no flak, nothing. We flew on for quite some time together in this funny little formation. I recognised by the way he flew that he must have been a good pilot, maybe an ace. He flew around me like a golden eagle protecting its eyrie, and I knew that he would not let anyone near me. I felt secure. As we neared the target he flew even closer to me and then with his thumb, pointed downwards at my target. We must have crossed the frontline at that point because all hell broke loose. I was so surprised – after all, this was my first operational sortie. The target lay before me, ringed by a hail of fire.

'As I made my attack dive, my fighter escort climbed away to stay beyond range of the enemy flak. All I could see around me were black clouds from the enemy guns. Occasionally, within these black clouds, I could see little flashes of light from the tracer – just like when you throw more wood onto an already burning fire. I don't actually remember pressing the button to activate the separation, but my diving speed was 600-650 km/h. The lower component hit the first section of the three-section bridge, which exploded and landed on top of the next section.'

During Riedl's attack on Küstrin, the forces on his aircraft were so great that after separation he flew back to his base in a crab-like manner since the wing of his Fw 190 was twisted on one side. At such a diving speed, the connection between the two components had distorted and buckled. Following separation, Riedl found himself dazed and flying upside down low over a forest on the east bank of the Oder. He had completely lost his sense of direction and had to re-orientate himself for his return flight. As he gathered his senses, he found himself flying over a column of refugees fleeing west. It was dark by the time Riedl returned to Straussberg, and he made a side-slip landing because of the damage incurred to the wing of his fighter;

'On landing at Straussberg I went to report the results of my attack to the control room. A young fellow in flying overalls was sitting there on a table. I knew who he was immediately – he was my escort. Relief showed in his face as we stood and clapped each other on the shoulder. He had

A *Mistel* S2 comprising an Fw 190F-8 mated with a Ju 88G-1, possibly at Löbnitz, and photographed after the cessation of hostilities. The combination carries its *Reparaturwerkstatt* number '50' in the centre of the fuselage *Balkenkreuze* on both the Focke-Wulf and the Junkers, as well as on the rudder of the Fw 190. The Ju 88 appears to carry the unidentified unit code '6D' forward of its *Balkenkreuz*

been greatly worried, for he had lost sight of me among the barrage of fire as I released myself from the Ju 88 below me. We thought we deserved a drink. We walked over to the canteen and shed our flying kit. I was astonished. Before me stood an Oberleutnant and holder of the Knight's Cross. He noted my surprise and said immediately, gesturing to his medal, "This doesn't change anything". A long conversation followed.

'He told me that, on receiving orders to provide fighter escort for a "secret bird", he had been very curious and had picked the first aircraft on the list. That was me. His curiosity had been more than satisfied, especially when the fireworks started up. He told me, "The whole of the Red Army must have fired at us but you still hit the first third of that bridge". He said this with some respect in his voice, and I felt a little proud. We had more than one drink that night.

'Next morning, as we stood together while my machine was being refuelled, we found it difficult to express our feelings. We shook hands for a long, long time. The situation forced us to go our separate ways. He took off first, waggling his wings in farewell. I stared after him for a long time. I took off a little later, but first I had trouble with my very battered Fw 190. A hand-written notice on the steps to the cockpit stated, "Not Cleared for Flight". At first I thought it was a joke and threw the notice away, but then a red-faced senior engineer and writer of the notice hurried over and severely reprimanded me. I demanded to speak with the representative from Baumbach's staff, but he gave me some well-meant words of advice although, in reality, I knew myself what a state my ruffled bird was in. After all, I had managed to keep it in the air from Küstrin to Straussberg. I just did not want to leave my "old friend" where it was as the fighter had supported me all the way home.

'It was the most difficult takeoff I had ever had to make, but once in the air the Fw 190 and I slowly wandered towards Peenemünde. It was my last flight for the Luftwaffe. It was 13 April 1945. Many weeks after this

mission, whilst I was a PoW at Grossenbrode, I met a German paratrooper who had been defending a position close to the bridge, only some 100 metres away from the nearest Russian soldiers. He told me that as my lone *Mistel* had flown over the bridge, all the German paratroops began waving and cheering as if to say, "At last! Our long awaited secret weapons have arrived!" Not much of a "secret weapon", but there you are.'

Also operational against the Küstrin bridges from Peenemünde on 12 April were four *Mistel* from KG(J) 30, led by a Ju 88S *Zielfinder* of I./KG 66. The Ju 88 flew three kilometres ahead and 460 metres above so that the four *Mistel* could see it. As the formation embarked on the glide towards the target, the pilot of the Ju 88 waggled his wings as the signal for the *Mistel* to launch. After separation, the Fw 190s strafed the Soviet anti-aircraft emplacements. No successes were confirmed, although all pilots believed that they had delivered their missiles successfully.

Two days later, four *Mistel* from I./KG(J) 30, flown by three Unteroffizier, Kurt Kesten, Karl Merkle and Karl-Heinz Wiesner, and another unidentified pilot, took off at 1740 hrs from Rostock-Marienehe to attack one of the bridges at Küstrin, to the north of the town. During takeoff Wiesner, an experienced Ju 88 pilot who had flown with I./KG 30 since the summer of 1943, became aware that his *Mistel* felt 'sluggish'. He was unaware that the metal tow-bar from the tractor that had towed him out to his start position on the runway at Marienehe was still fixed to his aircraft! Having lifted off the ground, he completed a circuit around the airfield before the bar detached itself and dropped into a field. The *Mistel* proceeded to their target, and Merkle later reported;

'We had excellent fighter cover from four *Schwärme* of JG 11 up to the actual attack. When we reached the area of well-aimed Soviet anti-aircraft fire they turned away towards the front. My explosive payload received heavy flak damage as I made a wide easterly turn towards my target. At 1942 hrs, from an altitude of 1800 metres, I made a flat approach from the southeast to west-northwest in the direction of the Oder as the fourth and last *Mistel*. Suddenly, close at starboard, a Soviet Yak-3 appeared. I looked back and received serious hits and was wounded by cannon fire. As it turned out, my instrument panel was completely shot up. Furthermore, there were 24 holes in the wings and fuselage of the fighter. There were four holes in the propeller [of the Fw 190]. I immediately pushed the release lever and the explosive charge felt as if my fighter was shot off. At 2020 hrs I made a belly-landing.'

On 16 April four *Mistel* from 6./KG 200 were again tasked with attacking the Küstrin bridges, relying on Ju 188s from I./KG 66 for guidance. For this operation the composites were flown from Burg to Parchim to be made ready, whilst the Ju 188 *Zielfinder* flew in from Neubrandenburg and Rostock. To the detriment of the mission planners, however, the Allied air forces chose the 16th to launch large-scale fighter sweeps and strafing missions against airfields throughout Germany and Czechoslovakia. The skies were teeming with Allied fighters. In the air around Parchim at that time were a number of Spitfire IXs of No 411 Sqn, RCAF, which had been ordered to conduct armed reconnaissance and fighter sweeps over central and eastern Germany that evening. Flt Lt D C Gordon was leading the squadron, and he later reported;

A newly completed *Mistel* S2 formed from an Fw 190A-8 and Ju 88G-1 Wk-Nr.590153, found by US forces at the assembly facility at Merseburg in May 1945. The Fw 190 carries the number '97' on its rudder

'After an hour of hunting for enemy motorised transport, we crossed over Parchim aerodrome where there was a Ju 88 starting to take off. When he saw Spitfires above, he closed his throttles quickly and slewed off the runway. We then orbited looking for any airborne enemy aircraft and spotted a Ju 88 with an Fw 190 pick-a-back on it. I closed to 500 yards astern and opened fire. At the same time the Fw 190 separated from the Ju 88. On this burst, large pieces flew off the Ju 88 and it caught fire and crashed. In hitting the ground it made a tremendous explosion.'

Flying with Gordon was Flg Off D J Bazett;

'My leader sighted a Ju 88 and Fw 190 pick-a-back and attacked, with strikes on the Ju 88. The Fw 190 was launched and broke to port. My leader told me to follow the Fw 190. On my first one-second burst from approximately 300 yards I observed strikes on the fuselage. A couple of succeeding bursts were ineffective. I settled down, and my last one-second burst obtained strikes on the port side of the engine. The aircraft started to burn, turned onto its back and hit the deck from about 200 ft, bursting into flames. I claim one Fw 190 destroyed.'

This was probably the last *Mistel* to be shot down in combat by the Allied air forces, although the identity of its pilot is unknown.

The next day, in his bunker in Berlin, Adolf Hitler assured the Luftwaffe Chief of General Staff, *General der Flieger* Karl Koller, 'The Russians will suffer the bloodiest defeat imaginable in front of Berlin'.

That afternoon (17 April), seven *Mistel* from 3./KG(J) 30 were readied for take off from Peenemünde for a mission against the bridges at Küstrin. In total, it was planned to despatch three 'attack groups' drawn from the *Staffeln* of I. *Gruppe*. However, at Oranienburg and Marienehe, the first *Mistel* that attempted to take off crashed and the rest were forced to remain on the ground. Details of any subsequent successes achieved by I./KG(J) 30 on that day remain unknown, although only two pilots returned. One of the two, Oberfähnrich Georg Gutsche, who had belly-landed in his Fw 190 at Werneuchen, reported;

'The Americans came again at noon to bomb our airfield. However, this time the ceiling was so low that they had to look for other targets. We were able to take off, and our targets were the Oder bridges near Küstrin. I was barely over the front when I received hits in the wings of the Ju 88. The shells exploded between the wings and also damaged the wing of the Fw 190. The *Mistel* banked towards the left. Right rudder did not change the situation, and I had no choice but to blast the Ju 88 away. After that it was very difficult, despite full application of right rudder, to steer my "lame duck" Fw 190 towards the west.

'I was getting ready to use the parachute, but I suddenly saw a red wingtip light. That could only be a friendly aircraft heading for a friendly airfield. I followed it and saw the landing lights of an airfield. The machine in front of me turned into a final approach and landed. The lights went out immediately. I fired my emergency flares and the lights came on again and I attempted to land, but the landing gear and flaps were not operable. I killed the throttle and raced along at an altitude of one metre and a speed of 270 km/h. I reached the end of the runway in a flash, so I pulled up again and slowly and carefully made a 180-degree turn. This time I had to come down. Again I fired my flares and again the lights came on. Throttle in. At 270 km/h I slid along the ground, hands in front of my face. The fighter tore along the grass and somersaulted at what turned out to be the emergency field at Werneuchen. Another pilot from the mission also landed there.'

On 20 April 1945 – Adolf Hitler's 56th birthday – the Allies mounted a heavy daylight raid by more than 800 USAAF bombers against rail targets in the Berlin area. The RAF would follow suit that night. The Red Army was only some 16 kilometres from the northeastern outskirts of the capital and the city shook with the impact of continuous Soviet shelling. On the 26th the communists broke through at Prenzlau. That day Feldwebel Kurt Kesten was one of three pilots of 3./KG(J) 30 who were briefed to conduct an operation against various bridge targets along the Rivers Oder, Neisse and Bober;

'While waiting to take off, I could see Unteroffizier Merkle's *Mistel* behind me. The three engines of Hauptmann Hans Röschlau's *Mistel*, which had started first, howled as he slowly rolled for takeoff. We saw the "double-decker" ground loop slightly to the left. He corrected, but lost speed and took off too late. The landing gear of the Ju 88 had struck a railway embankment at the edge of the airfield. Suddenly, the Fw 190 was alone in the air and the Ju 88 slid with retracted landing gear into an adjacent field. The Fw 190 climbed to altitude and turned for an exemplary landing approach. However, we now watched as the aircraft went into a half-roll and crashed and sank into a nearby lagoon on the Baltic coast. Although the altitude before approach was high enough for Röschlau to save himself by parachute, he was unable to do so.

'For us, there were a few worrying minutes as we were rescued from our four-and-a-half-metre-high lofty and narrow perches by means of simple wooden ladders, but the feared explosion of the "super bomb" never came. After this takeoff attempt we walked back to our quarters in a very depressed state.'

On 27 April at 3./KG(J) 30's base at Rostock-Marienehe, Feldwebel Karl Russmeyer's *Mistel* was one of a handful towed out to their starting positions. As he recalled;

'The *Mistel* were lined up early for takeoff. My mission for the day was a bridge over the Oder near Küstrin. After the briefing, we walked over to the aircraft where the hard-working groundcrews were waiting for us. There was a lot of mist and fog. Each steering setting was checked out one at a time. The check for the Fw 190 I carried out alone, based on a checklist that every pilot had to carry around his neck. Finally, all three engines were running, and I was the last pilot to signal the removal of the brake chocks.

'I soon rumbled at full throttle down the runway, but this time without any sign of ground looping. I quickly reached takeoff speed and lifted off the runway. What a good feeling to be up, and to be able to use autopilot without any problems. Since the takeoff distances between such sluggish aircraft had to be far apart, I soon found myself alone. Slowly, I reached proper altitude and found the visibility as bad as at takeoff. Now and then I had problems in finding the most obvious landmarks that had been clearly marked on my map. I discovered the silvery course of the Oder only after I had flown too far to the north – perhaps that was the reason it was so quiet around me – and on the ground there was no indication of any fighting around the river.

'I reached Straussberg on an easterly heading and flew over the railway tracks to get to the bend in the Oder. I then reached the front. Here, our troops were locked in combat with the Russians. Flak also made itself noticeable and our fighters were absent. The target – Küstrin – came closer and the bridges became visible in the haze. My target was the road bridge. With a few corrections, I was able to bring my aircraft into the correct approach pattern and soon after I was in the glide to release my explosive companion. A few more corrections and I had the bridge in my sights, and the remote control for the Ju 88 could be activated. After the separation and as I was pulling up, I noticed that I had hit only the western bridge moorings, since a giant cloud of smoke rose from this location. With the depressing thought that the Red Army could no longer be stopped and that Berlin and the war would soon be lost, I flew my Fw 190 at treetop level back to Rostock-Marienehe. The two *Mistel* that started ahead of me on that day did not return.'

On the morning of 30 April four *Mistel* S2s of 3./KG(J) 30 at Marienehe were assigned to make a strike against the Oder bridges between Tantow and Greifenhagen. The four composites were towed out onto the runway line astern, starting carts next to them, and the groundcrews waited for the arrival of the pilots. Oberleutnant Heinz Frommhold later recalled;

'At around 1000 hrs I climbed into the third *Mistel*. The rudders were checked prior to takeoff. Then the siren sounded and I received the signal to start engines. All three *Mistel* started immediately and sounded good. Looking over my pre-flight checklist, I made the necessary adjustments and gave the signal that I was ready. The two *Mistel* in front of me took off without mishap. The first one left the airfield in a flat right turn and the second one had just lifted off the runway when I too was given permission, via a green lamp, to take off. The precarious feeling in my

In late 1944 plans were made to develop a *Mistel* S3C, which was intended as a long-endurance composite comprising either an Fw 190A-8 or F-8 upper component featuring external, faired wing tanks fitted to its wing uppersurfaces, while the lower component was a Ju 88G-10 long-range *Zerstörer*. In order to bear the excessive weight of the combination, the Ju 88 was to have had a third wheel and leg added to the main undercarriage, which was to be jettisoned after takeoff. The *Mistel* S3C was intended as a training variant, powered by either Jumo 213 A or BMW 801 engines and armed with six MG 151s. Manufacture of the Ju 88G-10 commenced in 1944, with the first aircraft completed by Junkers at Dessau in March 1945. However, series production was abandoned, and it was decided to use all finished airframes – thought to have totalled ten – as *Mistel*, although only one machine, Wk-Nr. 460066, was actually converted. It is seen here as a *Mistel* S3C at Bernburg in April 1945, coupled with Fw 190A-8 Wk-Nr. 961243

stomach – just like the one I felt during my first takeoff – gave way to the conviction that what they could do, I could do.

'Carefully, I pushed the throttle forward, the left one before the other two. The contraption moved, picked up speed and I thought to myself, "Keep straight on the runway!" Every uneven stretch of runway seemed like a leap over a ditch, and with every bump I swayed four-and-a-half metres above the ground. Every rudder correction seemed to be a gamble. I had the feeling that my airspeed was not picking up fast enough, but the crate rumbled on until finally the tailwheel came off the runway. Ahead of the Fw 190's engine, I could just see the striped markers at the edge of the runway and I knew that I was going straight. The bumps stopped – it seemed like an eternity to me – and my *Mistel* was airborne. A quick check on the airspeed indicator revealed that I was okay. Retract landing gear. As I reached the edge of the runway and throttled back, I felt much better. The three BMW 801 engines ran a little rough, but then my ears were used to the sound of the Jumo 213.

'Obviously well trimmed, the *Mistel* seemed to climb all by itself. The airspeed increased and the altimeter passed the 300-metre mark. Flaps gradually reduced and I turned on a heading of 120 degrees towards Pasewalk, following the others. Automatically, I synchronised the engines. Following a quick check of the engine dials I switched the rudder to automatic. Everything was fine. Ahead of me and slightly above, I saw the *Mistel* that had taken off in front of me. They had reached cruising altitude. A look around – other than the two of them – the sky was empty.

'Below us, at 800 metres, we saw the first Cumulus clouds that seemed to become denser towards the east. When I reached 3000 metres I wanted to go to autopilot, and I pushed the control column slightly forward in order to bring the variometer to "zero", but the aircraft continued to climb. I pushed the control column forward a little harder, and then as hard as I could, but the nose of the Fw 190 just did not want to go down. The crate continued to climb. I became a little worried when I thought about the very first flight of a *Mistel*. From what I had been told, the *Mistel* had gone into a steep descent from which it did not recover.

'I checked everything – all the rudder controls were okay, the control light showing that the rudders were functioning normally. I had taken the aircraft out of autopilot. The climb increased and airspeed began to slowly

decrease. I pushed the throttle forward and the airspeed stabilised. I tried to remember whether I noticed any change in the elevator setting during my climb – no, everything had been normal. I switched all the rudder settings to "takeoff" in order to see if this would bring a change – nothing! I could not stop the climb. Then I remembered the "up" and "down" switch for the autopilot. Neither the descent nor the climb setting brought any change. I tried the same again with the autopilot on – no reaction.

'Meanwhile, the Fw 190's nose had gone up again and airspeed was falling again. I did not know what to do and I began to panic. Despite full throttle, the forward airspeed had gone down to 200 km/h. Under the circumstances, I had no other alternative than to launch the Ju 88. I throttled the Fw 190 to full power and activated the switch that would separate the Ju 88. A jolt, and the Fw 190 climbed steeply – minus the load. To the right, I observed my Ju 88 climbing to the southeast.

'Depressed, I returned to Marienehe and landed. For a time, I was plagued by the question of what I had done wrong. An hour later two other pilots landed. One had been attacked by a fighter and had had to separate from his dangerous load before the approach to the target. After a successful approach, the other had observed an explosion. He could not tell if he had hit the target, however. The fourth, an Unteroffizier, did not return from the mission. A few days later, the *Staffel* left Rostock-Marienehe for an uncertain future.'

On 1 May British forces under Field Marshal Montgomery continued their drive across northern Germany, advancing from the Elbe towards Berlin virtually unopposed. Adolf Hitler had committed suicide in his bunker and there was close-quarter street fighting with the Red Army in the capital. Hermann Göring was under house arrest in southern Germany for attempting to seize control of what remained of the Third Reich as a result of the *Führer*'s self-imposed incarceration.

The *Mistel* units finally ceased operations on 7 May. During the last few days of the war some of KG(J) 30's pilots were transferred to *Schlachtgeschwader* 3, where at least Unteroffizier Kurt Kesten and Unteroffizier Karl-Heinz Wiesner flew some ground-attack sorties in Fw 190s. The majority, however, found themselves marching west towards the Elbe, where they eventually surrendered to the Americans. To the north, at Tirstrup, four *Mistel* of II./KG 200 assigned for the *Drachenhöhle* attack on Scapa Flow were captured by the British.

Perhaps the greatest irony of the *Mistel* concept was that is was never deployed operationally in its originally intended role – that of air-landing troops in a glider – yet it failed miserably in the role in which it was eventually used. However, that failure was not associated with any technical shortcomings, for the serviceability rate amongst the small number of *Mistel* ever actually available at any one time was relatively high. Nor can it be associated with its pilots, who consistently demonstrated a quiet and determined courage to fly the apparatus in the first place. Furthermore, in terms of the military situation in which Germany found itself by 1944, the notion of using up war-weary bombers that had little prospect of ever being used again, by means of just one pilot, was not irrational. Rather, like the V-weapons and jet aircraft, it was a case of too little, too late.

APPENDICES

APPENDIX 1

***Mistel* S1 prototype ('Beethoven')**

After all 'unnecessary' equipment such as the dive-brake hydraulics, automatic dive mechanism, Ju 88 defensive armament, radio and bomb-aiming equipment was removed, the estimated weight of the *Mistel* S1 was as follows:

Messerschmitt Bf 109F

Empty Weight	2010 kg
Additional Equipment	246 kg
Fully Armed Weight	2256 kg
Fuel 700 litres	525 kg
Lubrication 300 litres	30 kg
Pilot and Personal Equipment	100 kg
2 MG 17 Belts for 500 Rounds	5 kg
2 x 500 Rounds MG 17 Ammunition	25 kg
MG-FF Drum for 60 Rounds	8 kg
60 Rounds MG-FF Ammunition	12 kg
Weight of Disposable Fuel Tank	18 kg
Total Additional Weight	723 kg

Junkers Ju 88A-4

Fully Armed Weight	8715 kg
Fuel	2450 kg
Lubrication	200 kg
Total Overall Weight	11,365 kg
Removed Weight	1500 kg
Total Final Weight	9865 kg

Bf 109F and Ju 88A

Total Weight	12,844 kg
Explosives	3156 kg
Maximum Takeoff Weight	16,000 kg

APPENDIX 2

Pre-flight Checklist for *Mistel* S2

1) Trim the Ju 88 to 'zero'
2) Trim the Fw 190 to 'zero'
3) Set the Ju 88 landing flaps for takeoff
4) Set the Fw 190 landing flaps for takeoff
5) Set the Ju 88 propeller switch to '12 o'clock' position
6) Set the Fw 190 propeller to 'automatic'
7) Set rudder servo-motor switch to 'takeoff'
8) Hollow charge fuse switch to 'unprimed'
9) Set directional gyroscope to departure course
10) Undercarriage locking switch 'up' to lock
11) Check the transfer function of the rudder servo-motor on the Ju 88 rudder

APPENDIX 3

Performance Data for *Mistel* S3

Fuel load Ju 88G-10	6130 kg
Fuel load Fw 190 with 2 x Doppelreiter and drop tank	1064 kg
Takeoff weight	23,600 kg
Maximum speed at sea level	320 km/h
Maximum speed at 4000 m (13,123 ft)	340 km/h
Range	4100 km

COLOUR PLATES

1

Kl 35 D-EXCM and DFS 230B-2 'CB+ZB' of the *Deutsche Forschungsanstalt für Segelflug 'Ernst Udet'*, Ainring, Germany, October 1942

This combination was used to conduct early wartime composite trials at the DFS facility at Ainring in late 1942. The Klemm was a standard trainer finished in overall RLM 02 with an early style *Hakenkreuz* on a white disc and red tail band, while the uppersurfaces of the DFS 230 were in RLM 70, with a high demarcation line meeting with RLM 76 on the lower fuselage and undersurfaces. The codes were in black.

2

Fw 56 'CA+GN' and DFS 230B-2 'CB+ZB' of the *Deutsche Forschungsanstalt für Segelflug 'Ernst Udet'*, Ainring, Germany, October 1942

An Fw 56 later replaced the Kl 35 seen in Profile 1. The Fw 56 was a machine drawn from the *Flugzeugführerschule* (FFS) A/B 112 at Böblingen, and it was finished in bare metal, with uppersurfaces in RLM 70/71 that extended over the top of the fuselage. The FFS A/B 112 emblem featured a stylised eagle in gold on a blue shield.

3

Bf 109E 'A' and DFS 230B-2 D-IEXX of the *Deutsche Forschungsanstalt für Segelflug 'Ernst Udet'*, Ainring, Germany, 1943-44

The combination of a Bf 109E and a DFS 230 was used by the DFS at Ainring from the summer of 1943. The presence of a yellow fuselage band on the fighter may indicate an aircraft that had previously seen service either in the Balkans or on the Eastern Front.

4

Bf 109F-4 Trop Wk-Nr. 10184/'CI+MX' and Ju 88A-4 'KL+CO' of the *Deutsche Forschungsanstalt für Segelflug 'Ernst Udet'*, Ainring, Germany, 1944

The first composite to fly under the 'Beethoven' trials at Ainring, this combination was formed by mating what was probably a factory-fresh Bf 109F-4 Trop with a Ju 88 assigned to the DFS and used for testing purposes. The Bf 109 is finished in a typical mid-war mottled pattern while the Ju 88 has a standard RLM 70/71 splinter scheme.

5

***Mistel* S1 (Bf 109F-4 'DE+RB' and Ju 88A-4), Junkers' *Baustelle Nordhausen*, Nordhausen, Germany, early 1944**

One of the early composites completed by Junkers at its *Baustelle Nordhausen* works in early 1944, this aircraft has its works conversion number – '38' – applied in white to the upper part of the *Balkenkreuze* on the Bf 109 and partly applied to the rudder of the Ju 88..

6

***Mistel* S1 (Bf 109F-4 Trop Wk-Nr. 10130/'CD+LX' and Ju 88A-4, Wk-Nr. 10096/'5T+CK') of 2./KG 101, St Dizier, France, June 1944**

This was the *Mistel* flown by Oberfeldwebel Heinz Lochmüller against Allied shipping off Normandy on the night of 14/15 June 1944. The Bf 109 was completed in a factory finish of a light mottle of RLM 74/75 with RLM 65 undersurfaces. The Ju 88 was finished in a strident splinter pattern of RLM 02/71/72, which extended to the tip of the warhead. A large white number '5' had been applied to the rudder of the Ju 88 almost certainly by the aircraft's previous operator, most likely a training unit.

7

***Mistel* S1 (Bf 109F Wk-Nr. 5704/'NA+YS' and Ju 88A-4 'CN+FK') of 2./KG 101, St Dizier, France, June 1944**

Mistel 'White 1' was flown from Nordhausen to 2./KG 101 at St Dizier on 18 June 1944 by the experienced acceptance pilot Heinz Schreiber, along with Feldwebel Willi Döhring and Feldwebel Bäzner. It would have been used for operations against Allied shipping off Normandy. The '1' was probably from the aircraft's previous operator, again most likely a training unit.

8

***Mistel* S1 (Bf 109F 'PI+MI' and Ju 88A-4) of 2./KG 101, St Dizier, France, June 1944**

'White 2' was another composite assembled at the Junkers' *Baustelle* at Nordhausen for operations with 2./KG 101 in France in the summer of 1944. The '2' was probably from the aircraft's previous operator, most likely a training unit.

9

***Mistel* S1 (Bf 109F-4 Wk-Nr. 13138/'SK+ML' and Ju 88C-6 Wk-Nr. 0430123/'SC+CE') probably of *Einsatzgruppe* 101, Burg, Germany, autumn 1944**

This composite was first tested at Nordhausen in August 1944 by acceptance pilot Heinz Schreiber. The Bf 109 was finished in a typical late-war mottle scheme, while the Ju 88 was in a darker RLM 70/71 splinter pattern. By this stage in the programme it is likely that both aircraft would have been refurbished operational machines.

10

***Mistel* S1 (Bf 109F-4 'CI+149' and Ju 88A-4) probably of *Einsatzgruppe* 101, Burg, autumn 1944**

This *Mistel* S1 is a typical example of an operationally ready composite in the West in the autumn of 1944. The Bf 109 is probably a 'war-weary' fighter that has come from a training school,

hence its three-digit '149' fuselage code, although part of the original *Stammkenzeichen* 'CI' is still visible. The Messerschmitt also has the works conversion number '8' painted into the upper area of the fuselage cross, and this number was also applied to the underwing *Balkenkreuze*.

11

Mistel S1 (Bf 109F-4 'DE+RB' and Ju 88A 'FI+LL') of II./KG 200, Burg, Germany, late 1944

This composite is believed to have been flown by Oberleutnant Dipl.-Ing. Horst-Dieter Lux, the Technical Officer of II./KG 200, for crew training purposes. However, it suffered damage at some point in the autumn of 1944 when it overturned. Bf 109F-4 'DE+RB', which was also seen in Profile 5, carried the revised works conversion number '36' that had been used by another composite.

12

Mistel S2 (Fw 190A-8 and Ju 88G-1 Wk-Nr. 714633) of 6./KG 200, Tirstrup, Denmark, February 1945

One of the *Mistel* composites assigned to fly the *Drachenhöhle* operation to Scapa Flow in February 1945, this aircraft is portrayed here still in its S1 configuration after the ferry flight to Denmark from Germany. The intention was that the warhead would be fitted to the aircraft at a later date. The state of the Ju 88 in particular indicated exposure to the elements and/or operational usage, the bomber having a replacement rudder. The aircraft also bore a tactical number in red on its fin.

13

Mistel S2 (Fw 190A-8 and Ju 88G-1 Wk-Nr. 714050) of 6./KG 200, Tirstrup, Denmark, February 1945

This was the *Mistel* assigned to Feldwebel Rudi Riedl of 6./KG 200 for Operation *Drachenhöhle* in February 1945. The Ju 88 has been fitted with a warhead, while its rudder has a tactical number '12' in red, plus the numbers '618' (possibly the last three digits of the Fw 190's *Werknummer*) and RW 9 (*Reparaturwerkstatt* – works conversion number). The Fw 190 has the number '1' applied in white to its rudder.

14

Mistel S1 (Bf 109F and Ju 88A-4 'VK+QT') *Deutsche Forschungsanstalt für Segelflug*, Ainring, Germany, early 1945

This composite has been fitted with four spool containers as a wire guidance test apparatus. The Bf 109 carries a yellow fuselage band, indicating an aircraft previously deployed on the Eastern Front, and has its works conversion number '52' applied within the *Balkenkreuz*.

15

Mistel S2 (Fw 190A-8 and Ju 88G-1 '4D+FK') of II./KG(J) 30, Oranienburg, Germany, April 1945

Most likely a composite of KG(J) 30 deployed over the Oder Front towards the end of the war, this *Mistel* consists of a Ju 88 nightfighter airframe that has been fitted with the later, shorter warhead, and an Fw 190 that boasts a drop tank, suggesting a long-range mission. The Focke-Wulf carries a small *Reparaturwerkstatt* number ('44') within its *Balkenkreuz*.

16

Mistel S3C (Fw 190A-8 and Ju 88G-10) Junkers Bernburg, Germany, April 1945

This newly completed *Mistel* S3C was found by US forces at Bernburg in April 1945. The Ju 88G-10 is probably finished in overall RLM 76, with fuselage, wing and cowling uppersurfaces mottles of RLM 75 or 77. The Fw 190 appears to have an unusual grey fuselage cross.

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Note: locators in **bold** refer to illustrations and captions.

First published in Great Britain in 2015 by Osprey Publishing
PO Box 883, Oxford, OX1 9PL, UK
PO Box 3985, New York, NY 10185-3985, USA

E-mail: **info@ospreypublishing.com**

Osprey Publishing, part of Bloomsbury Publishing Plc

A CIP catalogue record for this book is available from the British Library

ISBN: 978 1 4728 0846 2
PDF e-book ISBN: 978 1 4728 0847 9
e-Pub ISBN: 978 1 4728 0848 6

Edited by Tony Holmes
Cover Artwork by Mark Postlethwaite
Aircraft Profiles by Jim Laurier
Index by Fionbar Lyons
Originated by PDQ Digital Media Solutions, UK

Osprey Publishing is supporting the Woodland Trust, the UK's leading woodland conservation charity, by funding the dedication of trees.

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Acknowledgements

Firstly, I would like to re-acknowledge the former *Mistel* pilots and Allied servicemen who kindly offered me their recollections of either flying the composite or encountering it, either in the air or at sea, in various interviews and correspondence – Hans Altrogge, Heinz Frommhold, Fred Gottgetreu, Georg Gutsche, Lillian Howes (for information on Bernard H Howes), Rudolf Kainz, Kurt Kesten, Alfred Lew, Fritz Lorbach, Carl-Ernst Mengel, Peter Meryon, Balduin Pauli, Rudolf Riedl, Karl Russmeyer, Heinz Schreiber, John Waters and Burkhardt Winkler-Hermaden.

I would also like to thank Eddie J Creek and Willam A Medcalf for their help in supplying photographs for this book. Neil Page kindly provided me with more information on the activities of Horst-Dieter Lux, while Jürgen Rheker supplied details of his uncle's career in the Luftwaffe and his experiences flying the *Mistel* in June 1944. Finally, thank you to Martin Frauenheim for sharing information he had come across on *Mistel* operations in the autumn of 1944. My gratitude goes to all those mentioned, and to many others.

Front Cover

On 10 April 1945, former flying instructor Feldwebel Carl-Ernst Mengel of 6./KG 200 took off from Peenemünde-West airfield in a lone *Mistel* 2 composite comprising an Fw 190 upper component atop a Ju 88 lower component. His mission was to bomb the rail and road bridge at Neuhammer spanning the Neisse River, southeast of Görlitz. As Mengel made his steep dive towards the bridge, he was attacked by a Soviet 'MiG' fighter (almost certainly a Yak-3 or Yak-9). Despite his Fw 190 being hit by the enemy machine, he managed to launch his Ju 88 'bomb' and turn back towards the west. His aircraft was damaged and losing altitude, with one undercarriage leg shot up and hanging down, and smoke filled the cockpit. However, Mengel was able to lower the other mainwheel and land in open countryside. He survived the mission and was later picked up by his unit. It is not known whether any damage was inflicted to the Neuhammer bridge. Mark Postlethwaite's cover painting depicts Mengel's lone attack on the bridge, and it typifies many such sorties undertaken by the *Mistel* of II./KG 200 and KG(J) 30 against the Oder, Neisse and Vistula bridges in March and April 1945